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A Hayden Publication

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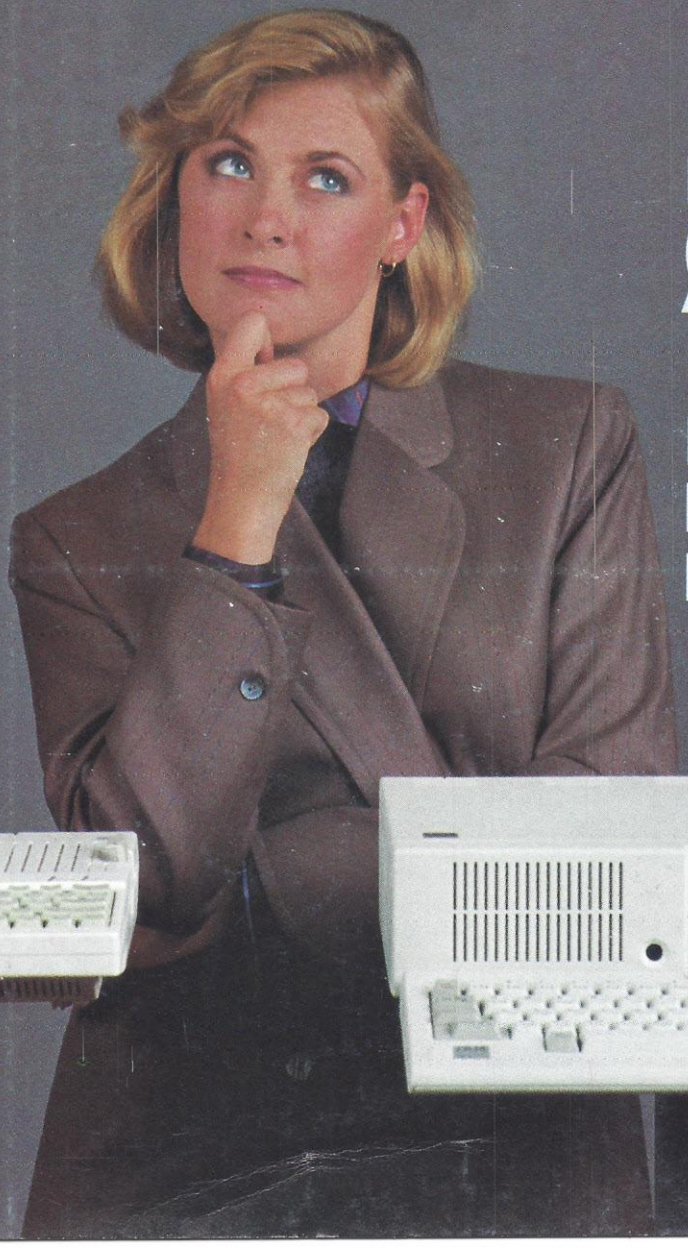

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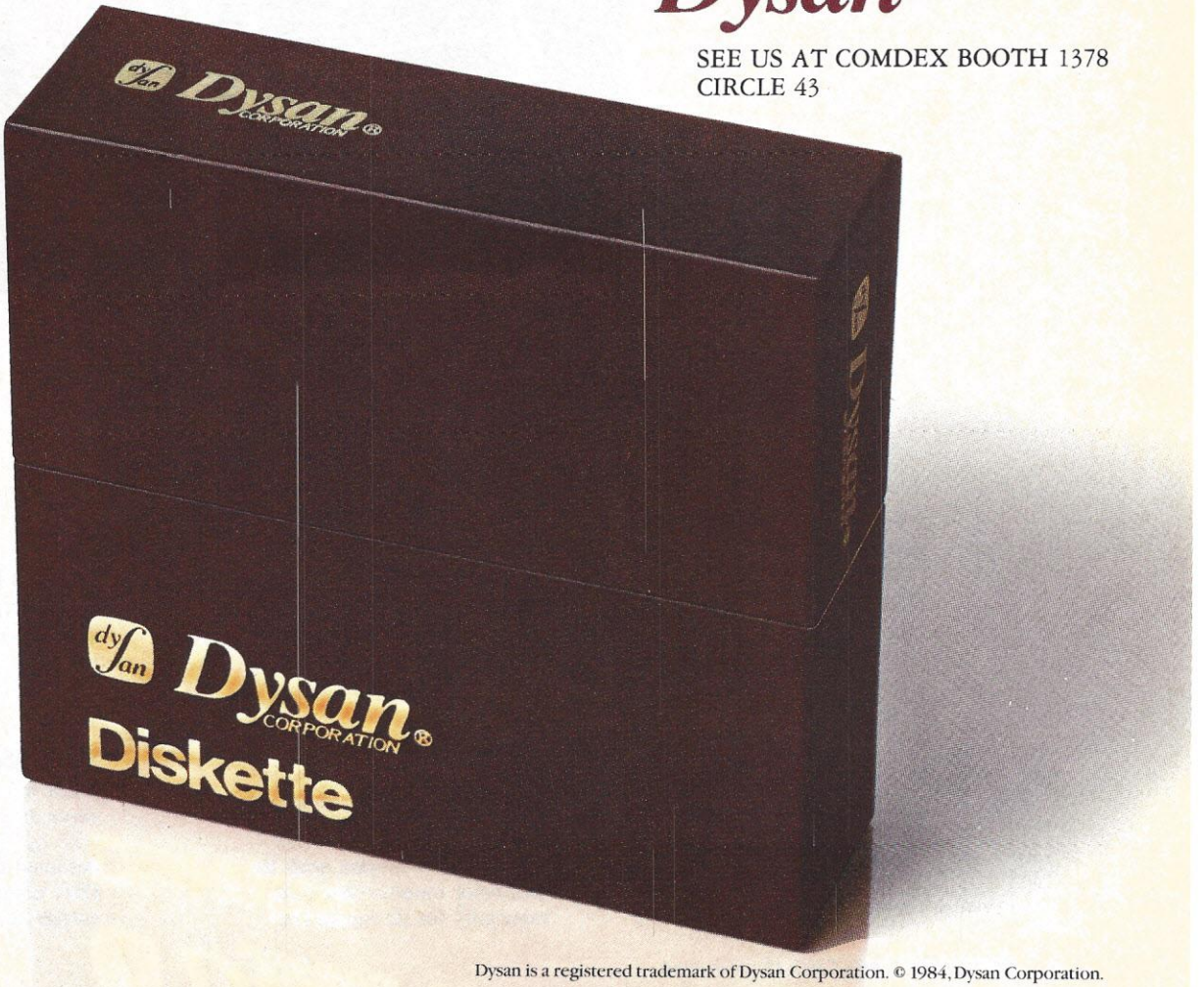

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PERSONAL COMPUTING

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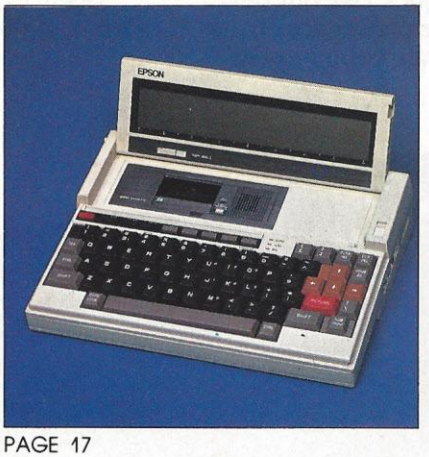

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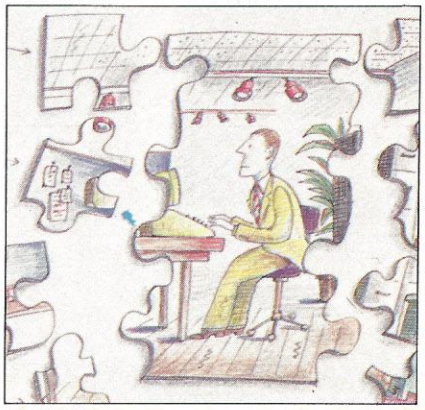

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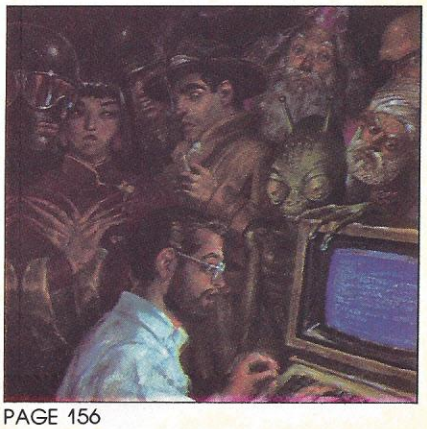

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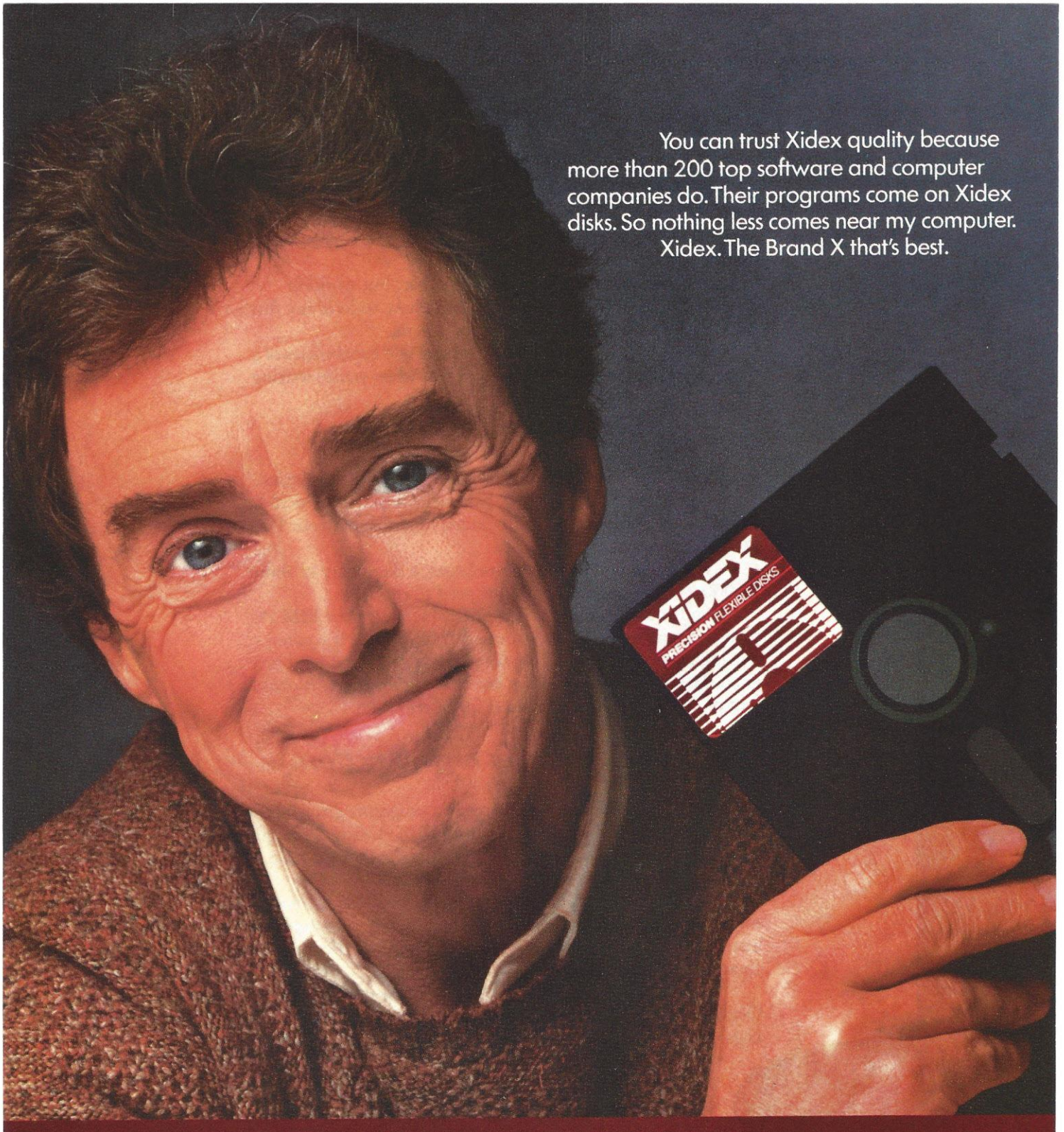

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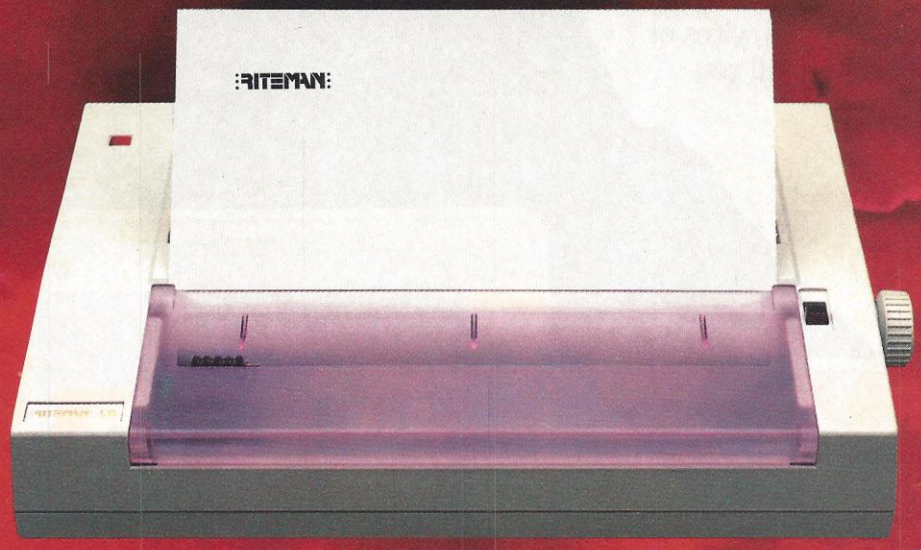

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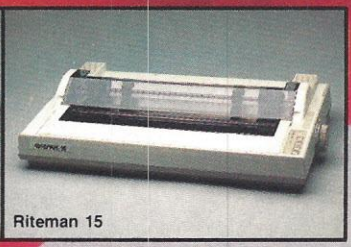

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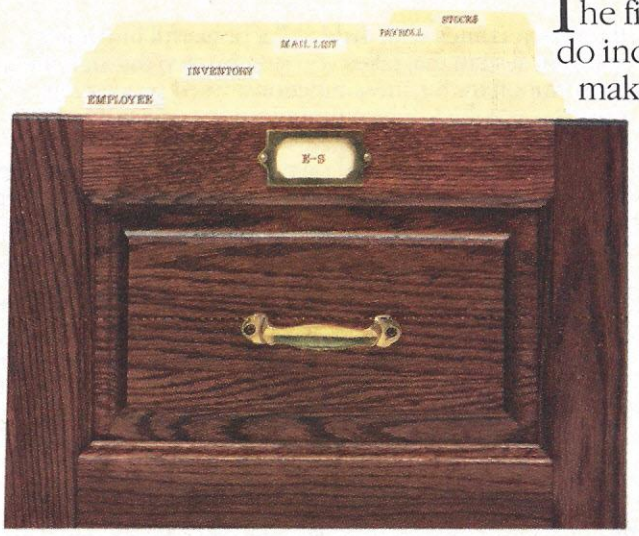

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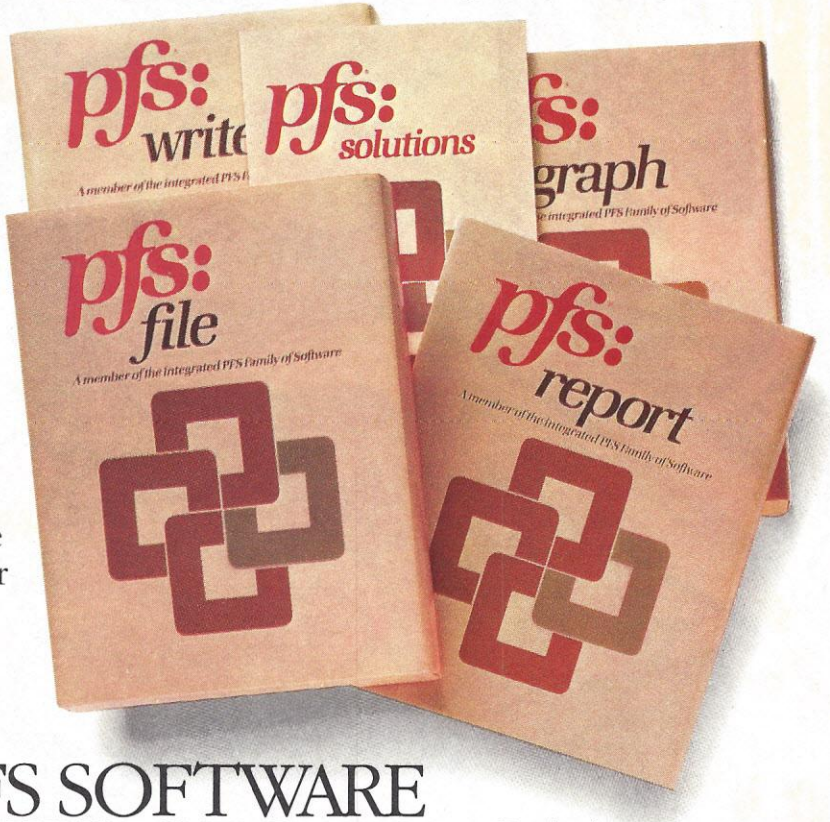

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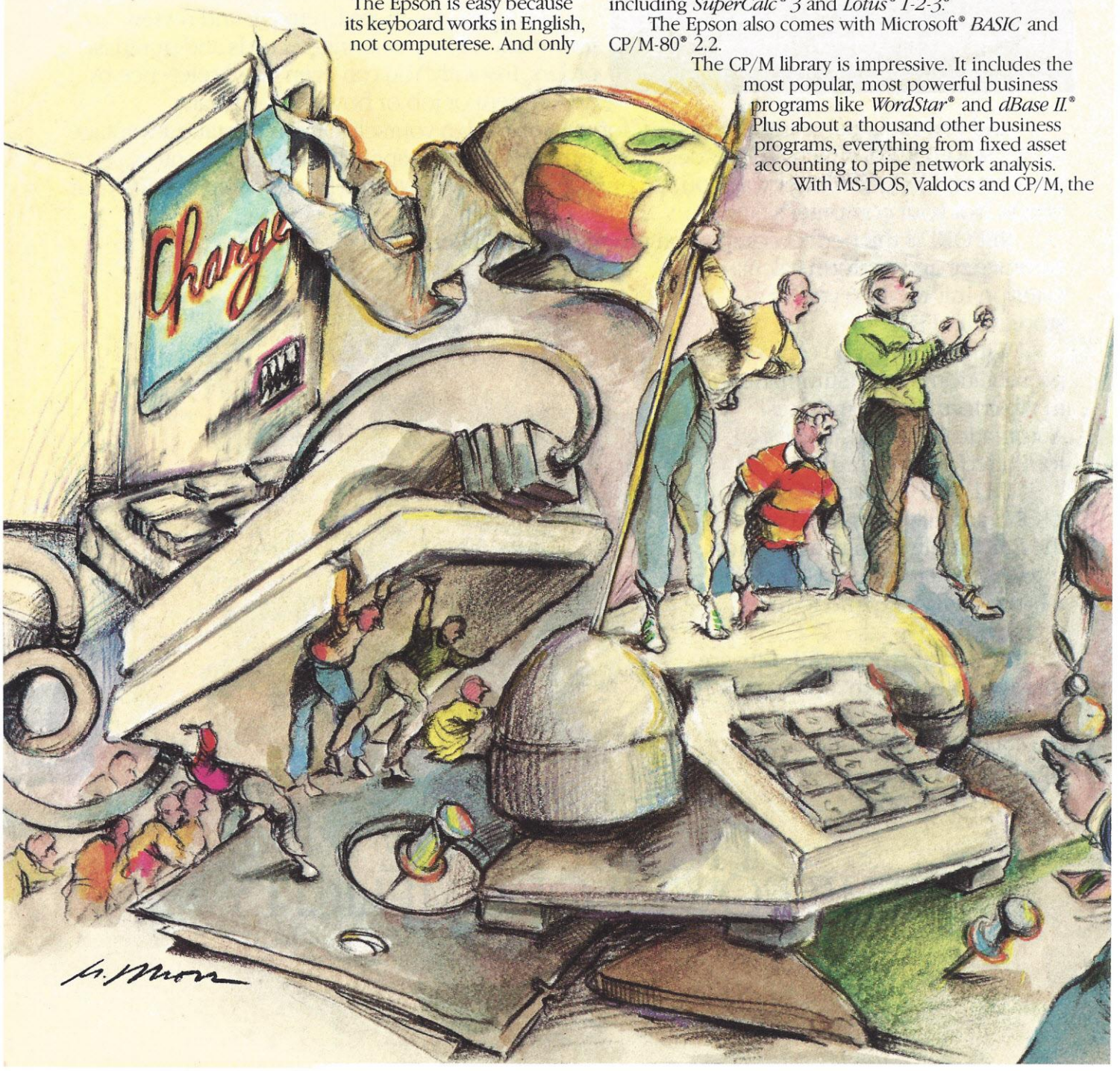

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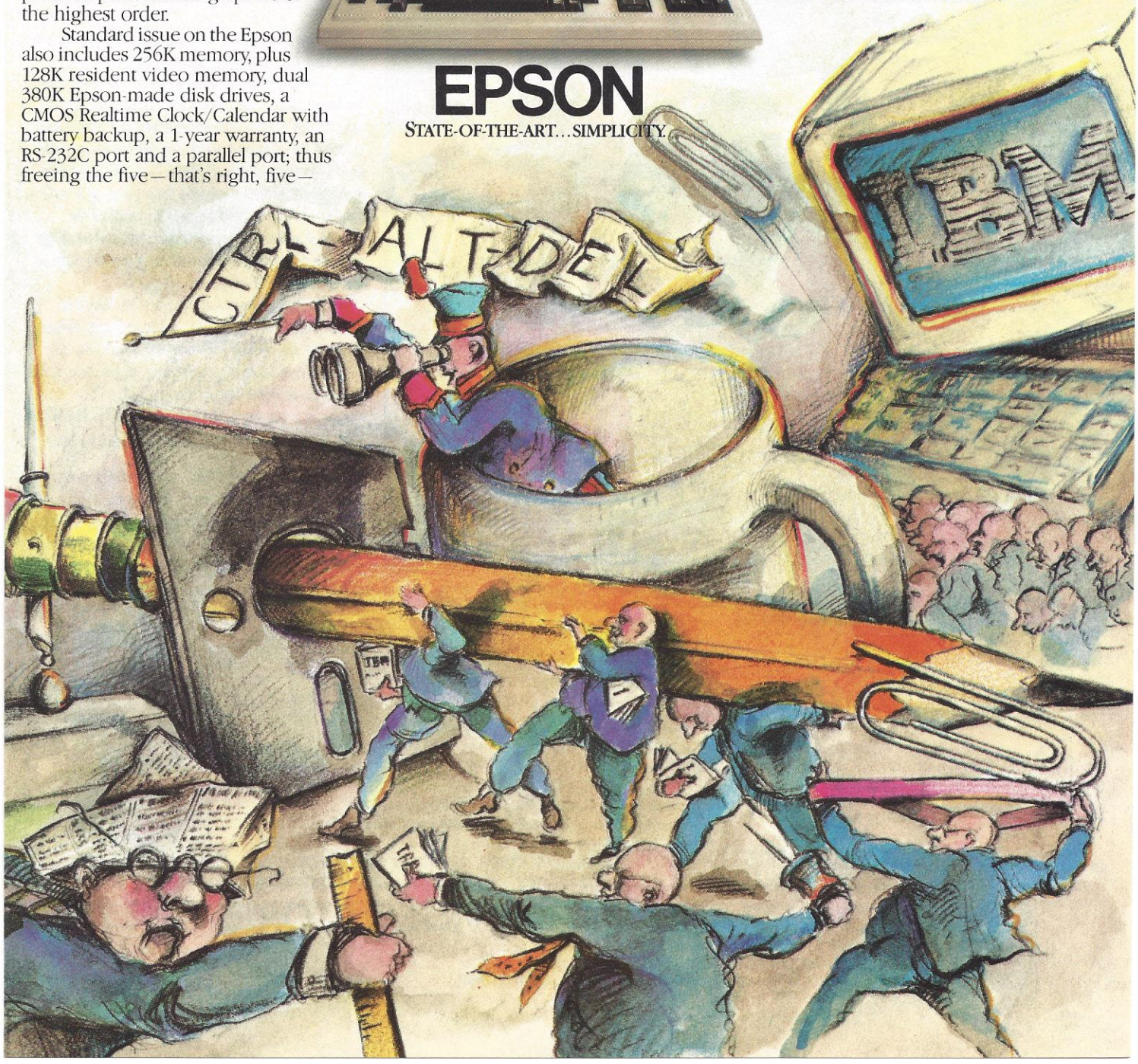

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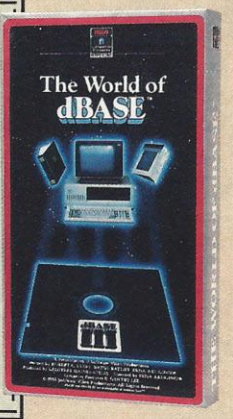

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MORE POWER IN A LAP-SIZE COMPUTER

by Paul Bonner, Senior Editor

A few years ago, the engineers at Epson America, Inc., had a wonderful idea: Why not pack the electronic innards of a personal computer, along with a full-size keyboard, into a lightweight, battery-powered box the size of a notebook so that people could take a portable machine all those places where a desktop model cannot go? Thus was born the Epson HX-20. Unfortunately, the machine was less than perfect. The HX-20's four-row by 20-column display was far too small, and its built-in dot matrix printer (which used adding machine-size paper) of little use. Epson did do a good job of selling the concept of lap-size computers, but that only paved the way for more capable machines, such as the Radio Shack TRS-80 Model 100 and the NEC PC-8200.

Now, however, Epson is back with a far more powerful lap-size computer—the Geneva/PX-8—which answers almost all of the complaints that have been voiced about the HX-20 and other lap-size computers. The Geneva has an 8-line by 80-column LCD display, 64k of RAM, 32k of ROM, a modified version of the CP/M 2.2 operating system, two 32k ROM capsule ports, a full ASCII keyboard, two serial interfaces, a built-in microcassette recorder for program or data storage, and a clock/calendar. It is shipped with four 32k ROM cartridges containing a version of Microsoft BASIC, several necessary CP/M utilities and two terminal programs, a spreadsheet and a time scheduler program, and a familiar-looking word processing program on a chip called Portable WordStar.

That's right, WordStar on a ROM cartridge. WordStar, CP/M, a spreadsheet and a time/scheduler on a lap-size computer. And they all work admirably well, even without any of the many optional accessories with which one can equip a Geneva. All considered, the $995 Geneva PX-8 is among the most versatile and friendliest portables available in its price range.

Slip off the Geneva/PX-8's keyboard cover and lift up the display, and an impressive little computer emerges.

With its slide-on keyboard cover in place, its carry handle extended, and its LCD display closed flat, the Geneva looks like nothing so much as a portable radio. But slip off the keyboard cover, and lift up the display (which tilts up in 15-degree increments all the way to 180 degrees), and an impressive little computer emerges.

The LCD display provides a sharp 80 columns of text, and the ability to adjust both the angle of the display and the amount of contrast makes it easy to read. It's also fairly fast for an LCD display. Of course, it still scrolls at a snail's pace compared to a CRT monitor, but it's not so slow that it's unbearable. However, if you're the impatient sort it is possible to enter commands much faster than the LCD display can refresh the screen, and thus until you get used to the display you may find yourself zipping through several menus unintentionally, or listening to several squawks from the Geneva's speaker (which luckily has a volume adjustment) as its type-ahead buffer enters the keystrokes which you only wish you could take back.

The keyboard is full-size, with separate cursor-control keys and five programmable function keys. The keys are

full-stroke, and the machine will apparently keep up with any typing speed. In fact, the only thing even slightly disconcerting about the keyboard is that you have to hit each key squarely from above. The kind of glancing blows you can get away with on an IBM or Apple keyboard will result in missed letters on the Geneva.

When you turn on the machine for the first time you are given the opportunity to configure up to 24k of RAM as a RAM disk. Doing so results in that portion of RAM being treated as a disk drive to which files can be saved. The RAM is refreshed by the Geneva's battery even when the machine is turned off, so when you turn it on again, the files you saved with the RAM disk are still present.

Once you've established the RAM drive, a menu appears listing the programs available on each of the machine's drives. A glance at the menu, which appears every time you turn on the machine unless you choose to disable it, demonstrates some of the nice tricks that Epson has accomplished with CP/M while customizing it for use on the Geneva. For instance, in the standard model Geneva, CP/M is convinced that it has four disk drives available: Drive A (the RAM disk), Drives C & D (the cartridge slots, which CP/M considers read-only drives), and Drive H (the microcassette recorder).

To augment the standard configuration of storage devices, Epson offers a 3.5″ battery-powered mini-floppy disk drive, which uses the same hard-case disks used in Apple's Macintosh. Priced at $599, the optional drive unit takes up only 8.25 by 4.75 by 2″ of desk or briefcase space, but adds 320k of disk storage to the Geneva.

For less expensive, and even more compact storage, Epson offers several optional RAM disk expansion units which, once installed, can be used as disk drives by any program running on the Geneva. The wedge-shaped expansion units attach to the bottom of the Geneva, adding about one inch to its 1.75″ height, but nothing to its 11.5″ width or 8.5″ depth. A 64k RAM disk is priced at $329, a 128k RAM disk is priced at $460, and a combination 64k RAM drive and 300-baud direct-connect autodial/autoanswer modem called Multiunit is available for $360.

We tested a unit equipped with a 128k RAM disk. With that unit, programs running on the Geneva have the machine's full 64k of on-board memory to operate within and view the expansion unit as a 120k disk drive. The RAM disk is an attractive alternative to using the Geneva's microcassette recorder for storage. The microcassette—while easy to use and reliable—is also very slow. It takes the Geneva two or three seconds to load a 26 by 26 spreadsheet from the RAM drive, and about five minutes to load it from the microcassette recorder.

The best thing about the Geneva, though, is its accompanying ROM cartridge software. WordStar operates almost exactly as it does on a full-size system; the files it creates, once transferred via modem or serial-link to another computer, can be edited by any version of WordStar. The spreadsheet included with the Geneva, called Portable Calc, is also full-featured, with such niceties as long labels, variable column width, and user-set automatic or manual recalculation. You can create a spreadsheet containing as many as 64 columns by 256 rows. The calendar/scheduler program included with the Geneva, called Portable Scheduler, lets you enter up to 500 messages or appointment reminders (depending on their length) for the 25-day "month" following the current date. It also functions as an alarm, so that even if the machine is turned off it will beep at a time you designate and display a message on its screen. Finally, the BASIC cartridge provides a version of Microsoft BASIC that has been adopted for the Geneva. Anyone familar with standard implementations of Microsoft BASIC should have no problem adapting to the one used in the Geneva.

The Epson Geneva is an impressive machine. Not perfect, though. There are a number of areas where one could ask for more. The first of those is speed. Although the Geneva will more than keep up with you while you type away in WordStar, there are times when it is very clear that this machine is no speed demon.

In a simple benchmark test written in BASIC, the Epson took 22 seconds to count to 10,000. The same program running on a Compaq took nine seconds. That performance is really not too bad, considering that the Epson is using an 8-bit Z80 microprocessor running at about 2.2 MHz, while the Compaq is equipped with a 16/8 bit 8088 running at 4.77 MHz. But when the program was amended to print each number on the screen as it counted from one to 100, the Geneva took 19 seconds to complete the task, while the Compaq took only three seconds, demonstrating conclusively that scrolling on the Geneva's LCD screen display can be rather slow.

Of course the Geneva, at four pounds, weighs considerably less than a Compaq, and will fit into a briefcase. So, for truly portable use, LCD screen and all, it's quite wonderful. It would be nice if there were some way to connect an external CRT monitor to the Geneva for those times when it is used near a power outlet. The Geneva's back panel has connectors for a number of devices that the average user is unlikely to ever need—including a bar code reader, an analog input, and an external speaker—but none for an external monitor.

Overall, however, the Geneva marks a positive step forward for the fortunes of lap-size computers, and those who would have occasion to use them. For people for whom the Radio Shack Model TRS-80 100 or the NEC PC-8200 "are not quite enough computer," the Geneva offers the features and versatility they need at an affordable price.

FOR MORE INFORMATION: EPSON AMERICA, INC., 3415 Kashiwa St., Torrance CA; (213) 539-9140.

CIRCLE 301

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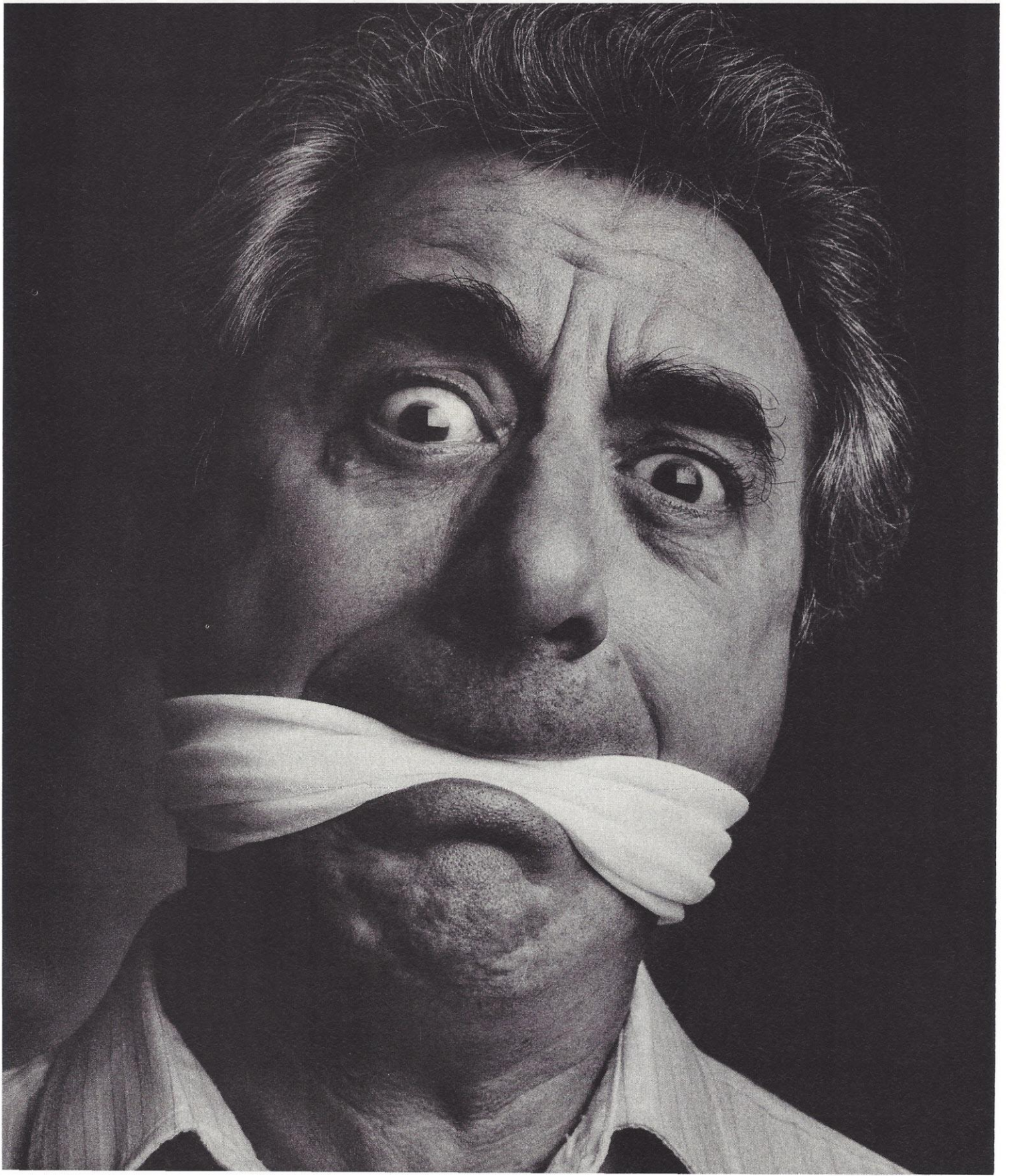
CIRCLE 2

To communicate voice the ordinary modem



and data simultaneously, leaves a lot to be desired.

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So much for words.

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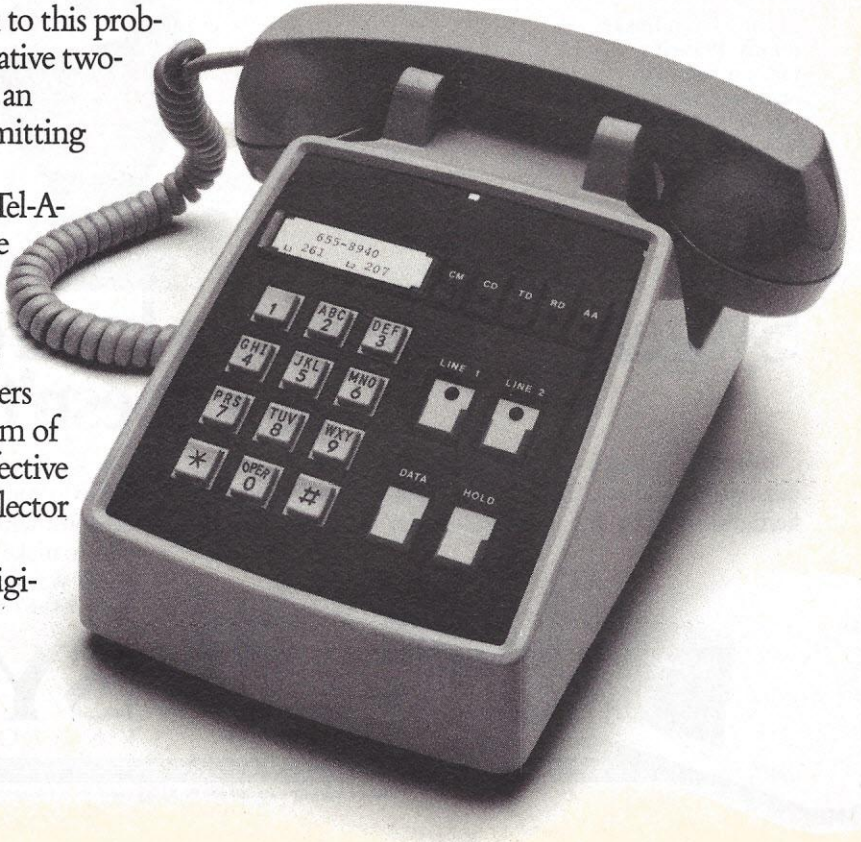

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CIRCLE 29

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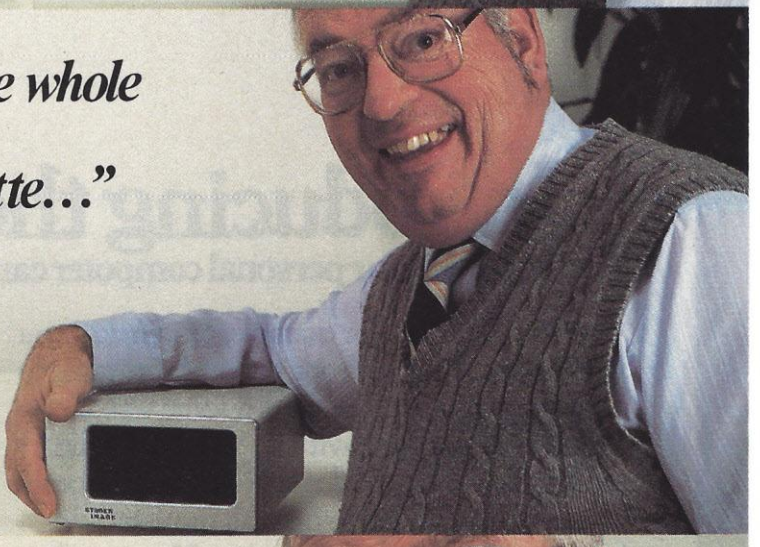

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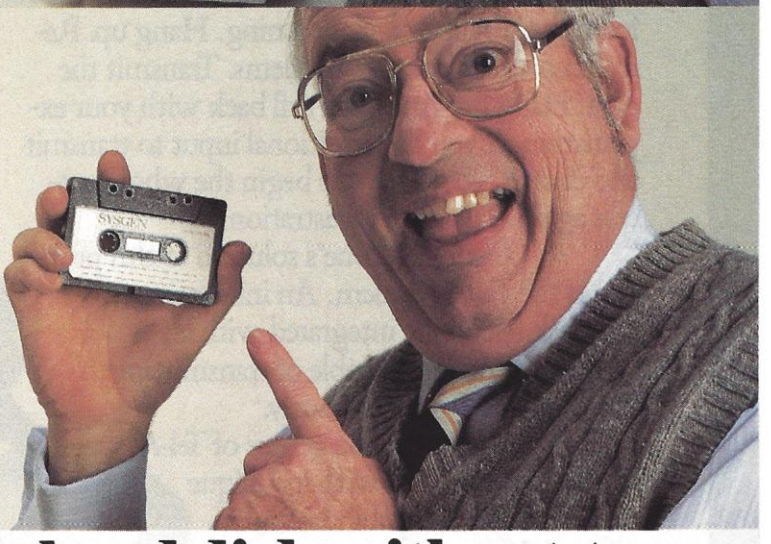

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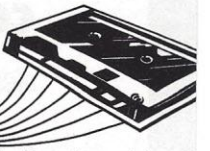


COLOR AND 80-COLUMN TEXT FOR THE APPLE IIe

by Edward Foster, Associate Editor

Apple Computer is entering the competitive color monitor market by introducing its own color monitor and graphics card for the Apple IIe, equipment that other manufacturers have been supplying until now. Apple's home-grown offerings consist of a RGB (red, green, blue) color display called the AppleColor Monitor 100 and the Extended 80-Column Text/Apple Color Card.

At a $599 list price for the monitor and $299 for the card, Apple is not playing games with its new entries and you probably won't either. The monitor is a serious, high-resolution device aimed primarily at business users for a combination of color graphics and data or word processing applications. It is styled and configured to operate with the IIe, but can be plugged in directly to the Apple III and III Plus and can also be used, via interface cards available from third parties, with the Apple II, II Plus and IIc.

Somewhat paradoxically, the strongest talking point for the monitor may be its monochrome display. This is not a knock on the color display. Rather, Apple's strategists felt what the market needed most was one monitor that could offer quality color while also offering highly readable 80-column text. They have succeeded in this, and anyone who's ever been forced to use 40-column displays because their graphics monitor couldn't produce legible 80-column characters will applaud their efforts. A worthwhile feature of the AppleColor Monitor is a "green-only" button on the front panel which allows you to switch from color display to monochrome emulation mode in an instant. The Extended 80-Column Text/AppleColor Card also contains a simple DIP switch that allows you to choose your monochrome color from a choice of green, amber, white or—in a rather unique touch—blue. However, the contrast of a blue-on-black display may not be strong enough for anyone who has to spend much time looking at the screen.

The color display itself supports the same type of RGB output that is standard on the Apple III product line. This is both good news and bad. On the positive side, existing color software for the Apple II and III families should run with no problem using the new monitor and card. In addition, the monitor will support a double high-resolution mode on the IIe which has begun to attract a variety of color software programs by independent vendors. The double high-resolution mode displays a grid of pixels up to 560 pixels wide by 192 high as compared to the high-resolution mode which most color software for the Apple family now supports at 280 pixels by 192.

What some people won't like about the RGB output is the intensity of the colors it produces in comparison to the RGB colors on the IBM Personal Computer and PCjr. Apple's implementation of color generates 16 distinct colors or shades on the screen as opposed to the IBM scheme which produces eight primary and secondary colors with two intensity levels. As Apple produces its shades through mixing red, blue and green colors in the monitor, the colors tend to be less intense in appearance than the IBM versions. In particular, there is no true red with the Apple RGB interface, but instead a dark magenta. The yellow shade actually corresponds to amber.

Courtesy of Apple Computer, Inc.

At $599 for the monitor and $299 for the card, Apple is not playing games with its new entries. You probably won't either.

The monitor and 80-column card install easily on the IIe, the card plugging into the auxiliary slot on the motherboard. A cable is supplied with the card that connects directly to the monitor through one of the ports behind the console. The monitor closely resembles the Apple Monitor II with the tiltable screen encased in a vertical frame with video controls located under a panel at the right of the screen. In fact, it is significantly larger than the monochrome Monitor II. To ensure the stability of the display even with the heavier components, Apple has added an interesting feature in a push button power tilting mechanism. By pressing the button the display moves slowly up and down to allow you to select the angle with least glare from surrounding light. The display will not tilt manually and can move in only one direction.

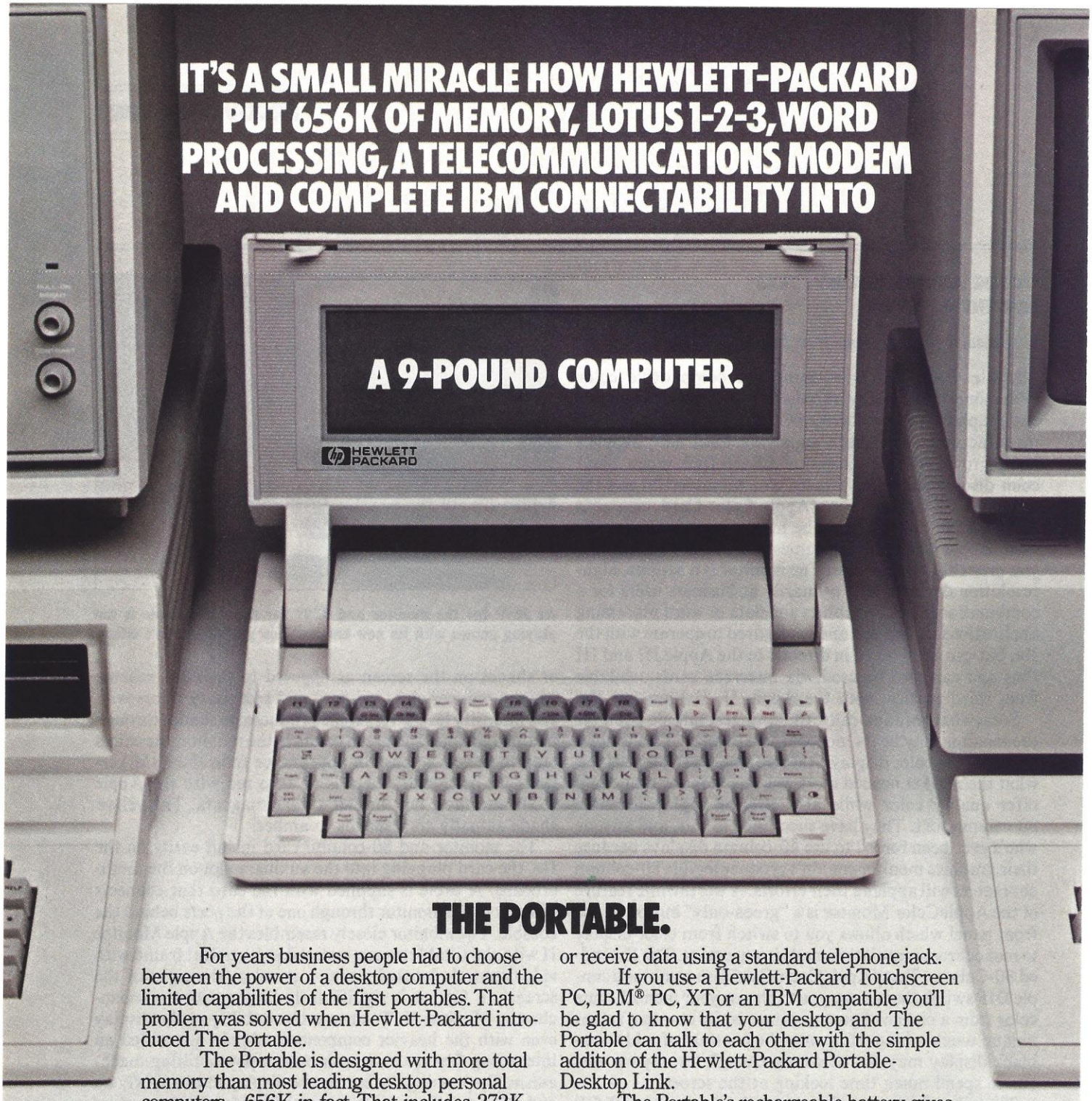
The monitor has one additional attractive feature in its reverse text highlighting technique. Instead of automatically using the same color as you have chosen for your text, the monitor will highlight reverse text in white.

The 80-column text/color card expands the IIe's memory to 128k, a necessity since it is used in the same auxiliary slot used by Apple's basic 80-column/expanded memory card. Those who already have such a card but want to add color to use the Monitor 100 can purchase one of the RGB output cards already on the market.

FOR MORE INFORMATION: APPLE COMPUTER, INC., 20525 Mariani Ave., Cupertino, CA 95014; (408) 996-1010.

CIRCLE 302

IT'S A SMALL MIRACLE HOW HEWLETT-PACKARD PUT 656K OF MEMORY, LOTUS 1-2-3, WORD PROCESSING, A TELECOMMUNICATIONS MODEM AND COMPLETE IBM CONNECTABILITY INTO



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SANYO'S MS-DOS ENTRY

by Christopher O'Malley, Associate Editor

Sanyo is a name familiar to many Americans, primarily as a leading manufacturer of video and stereo equipment. But Sanyo, like most Japanese manufacturers of consumer electronics gear, has yet to make its mark in the personal computer field—at least in the United States. One significant reason is that the company's personal computers were designed for and sold to the domestic Japanese market, where CP/M is a dominant operating system.

Recently, in an effort to move its computer products successfully into the U.S. market, Sanyo has transformed its most powerful personal computers—the MBC-550 series—into MS-DOS machines. While MS-DOS moves Sanyo closer to the mainstream of popular thinking about computers in this country, the transformation from CP/M was not a total one and comes with some side effects.

Sanyo's latest offering, the MBC-555, is a 16-bit personal computer based on Intel's 8088 microprocessor—the same chip used in the IBM Personal Computer (though the Sanyo microprocessor runs a bit slower). The MBC-555 comes in two models: the MBC-555-1, a dual floppy drive system with single-sided drives; and the MBC-555-2, also a dual drive system but with double-sided drives. The capacity of the disk drives (160k with the single-sided drives and 360k with the double) is the only difference between the two versions. The single-sided 555-1 retails for $1299 (without monitor), while the double-sided 555-2 costs an additional $200. Both models come with 128k memory as standard, expandable to only 256k, and run MS-DOS 2.11.

The matter of IBM compatibility arises for any personal computer running MS-DOS, of course. Does Sanyo's switch to MS-DOS mean that the MBC-555 can run the thousands of programs that are designed for the IBM Personal Computer? No, it does not. The MBC-555 is not a 100 percent IBM-compatible computer. Sanyo officials —while touting the machine as MS-DOS compatible— make no claims that the machine is an IBM clone. The Sanyo MBC-555 simply isn't hardware compatible with the IBM Personal Computer, says Mark Zeiger, manager of Sanyo's computer division research and development center. All of which means that the Sanyo MBC-555 is limited to programs that can run under MS-DOS 2.11 straight off the shelf, or software packages which the company chooses to convert especially for the 550 series.

Sanyo fills the software gap by bundling a generous amount of well-known programs into its computer package. The MBC-555 comes with MicroPro's WordStar and CalcStar, and IUS's EasyWriter I. In addition, a buyer receives a choice between StarPak (SpellStar, InfoStar and MailMerge) or EasyPak (EasyWriter II, EasyMailer, EasyFiler and EasyPlanner) software. The result, say Sanyo officials, is a system that comes complete with $2000 worth of big-name programs to get you computing economically and productively right away. These six or seven bundled programs may prove to be "all the business-type software you'll need to run your system," according to Zeiger. You won't, however, be limited to the bundled software. A Sanyo-published list cites more than 200 other compatible programs. There are versions of dBase II, Multiplan, Microsoft programming languages, and even Infocom adventure games available for the MBC-555.

The Sanyo MBC-555 has the slick, metallic look of a stereo. The entire unit measures 4" high and slightly less than 15″ wide.

But you will be limited by the fact that any MS-DOS program designed specifically for the IBM Personal Computer and IBM-compatible machines will *probably* not run on the Sanyo. And that is a serious limitation. A Lotus 1-2-3 or Flight Simulator fan is—at least until Sanyo provides otherwise—out of luck. Perhaps just as serious for anyone thinking of purchasing a Sanyo for the office is the inability of the Sanyo to easily pass information back and forth with the IBM Personal Computers—and their clones—that may be used by colleagues. For example, attempts to get either an IBM Personal Computer or a Compaq to read this review from a Sanyo disk were unsuccessful. Even an IBM formatted disk, which the Sanyo could read and write to using EasyWriter, could not transfer the file back to an IBM-compatible machine.

Beyond the issue of compatibility, however, the Sanyo MBC-555 is an attractive and competent personal computer with a comfortable feel. It has a slick, metallic look one might expect in a home stereo outfit. The CPU is slightly wider than the two half-height disk drives which are built in side-by-side. The entire unit measures 4″ high and slightly less than 15″ wide, leaving just enough room

for the power button and company emblem on the right. The drives have a slightly raspy sound to them and the red light above each drive, strangely enough, indicates which drive is active (has been used last) instead of lighting up only when the drive is spinning.

The keyboard on the MBC-555 is a detached, 85-key panel of matching silver and dark gray. It has a hard but snappy feel. The keys are "typomatic," or repeating, though the delay in initiating the repeat function is a bit too lengthy to give you precise control of the repeat sequence. An adjustable repeat setting would be handy. The coil cable which connects the keyboard to the CPU plugs in at the rear but still provides ample length for moving it around the desk or putting it on your lap if you're not leaning back too far. Five function keys on the left side of the keyboard are stretched into 10 with the use of the shift key, and a sunken reset key is situated just off the face of the unit to the extreme left. There is an oversize Return key which you could hit in your sleep; and indented F and J keys are designed to help keep your index fingers on the home keys. There are also shift-lock and graph keys with on/off LED lights, and a numeric keypad to the right complete with a 00 key and its own Return/Enter key. The number keys double as cursor movement keys.

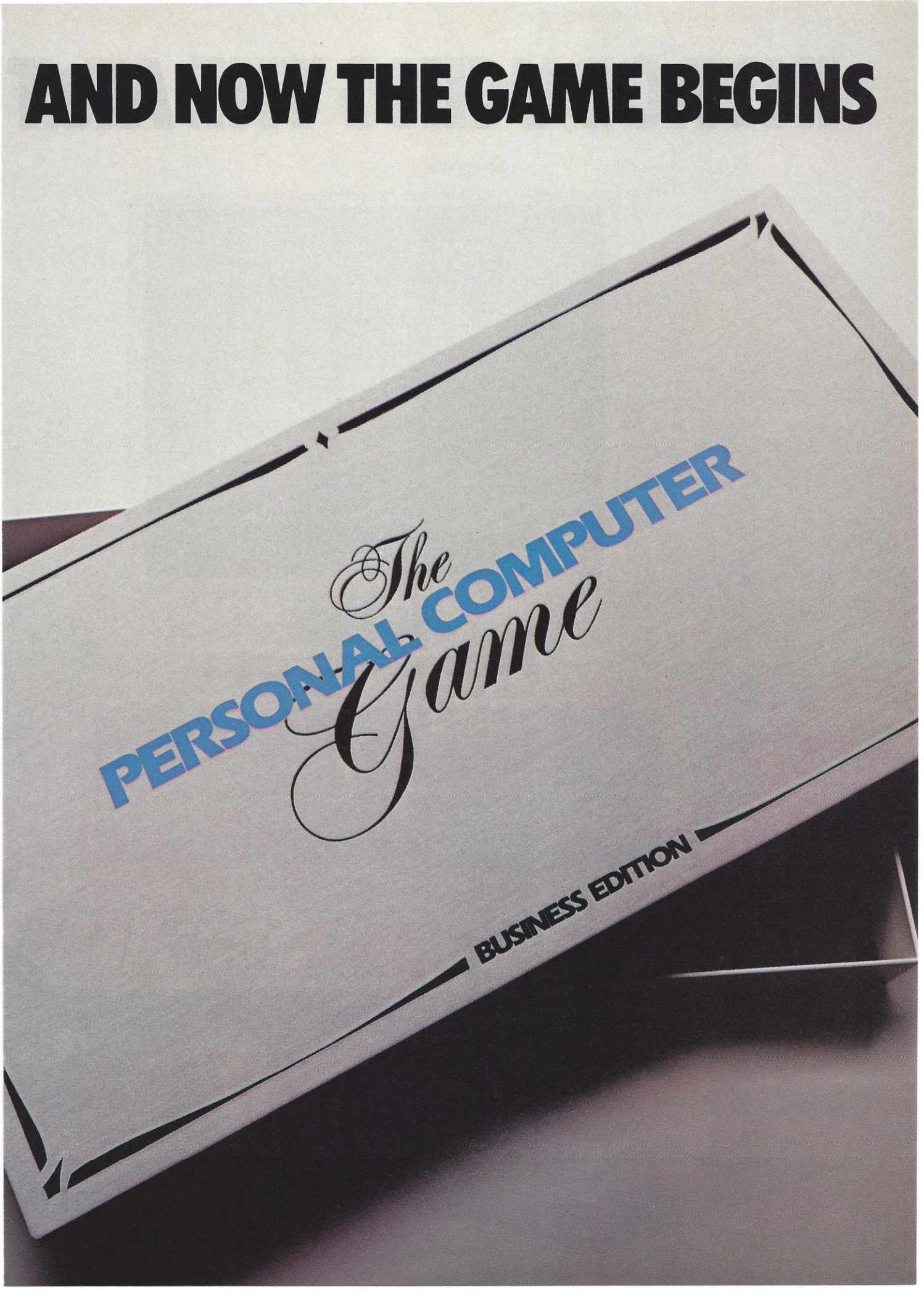
Notably absent from the keyboard are some IBM-style keys such as "Alt," "End" and "PrtSc"—omissions which illustrate the fact that the keyboard was engineered without IBM-compatibility in mind.

The Sanyo color monitor which accompanied the system for our review is an equally slick and metallic box that simply dwarfs the computer itself. At an almost perfectly square 14″ by 14″, the CRT-70 is an RGB (red-green-blue) monitor which performed sharply as both a color and green screen display. It carries a hefty $749 price tag, however. Fortunately, monochrome monitors are also available for the MBC-555 at a more down-to-earth $139 and $199 for the CRT-30 and CRT-36, respectively.

FOR MORE INFORMATION: SANYO BUSINESS SYSTEMS CORP., 51 Joseph St., Moonachie, NJ 07074; (201) 440-9300.

CIRCLE 303

AND NOW THE GAME BEGINS



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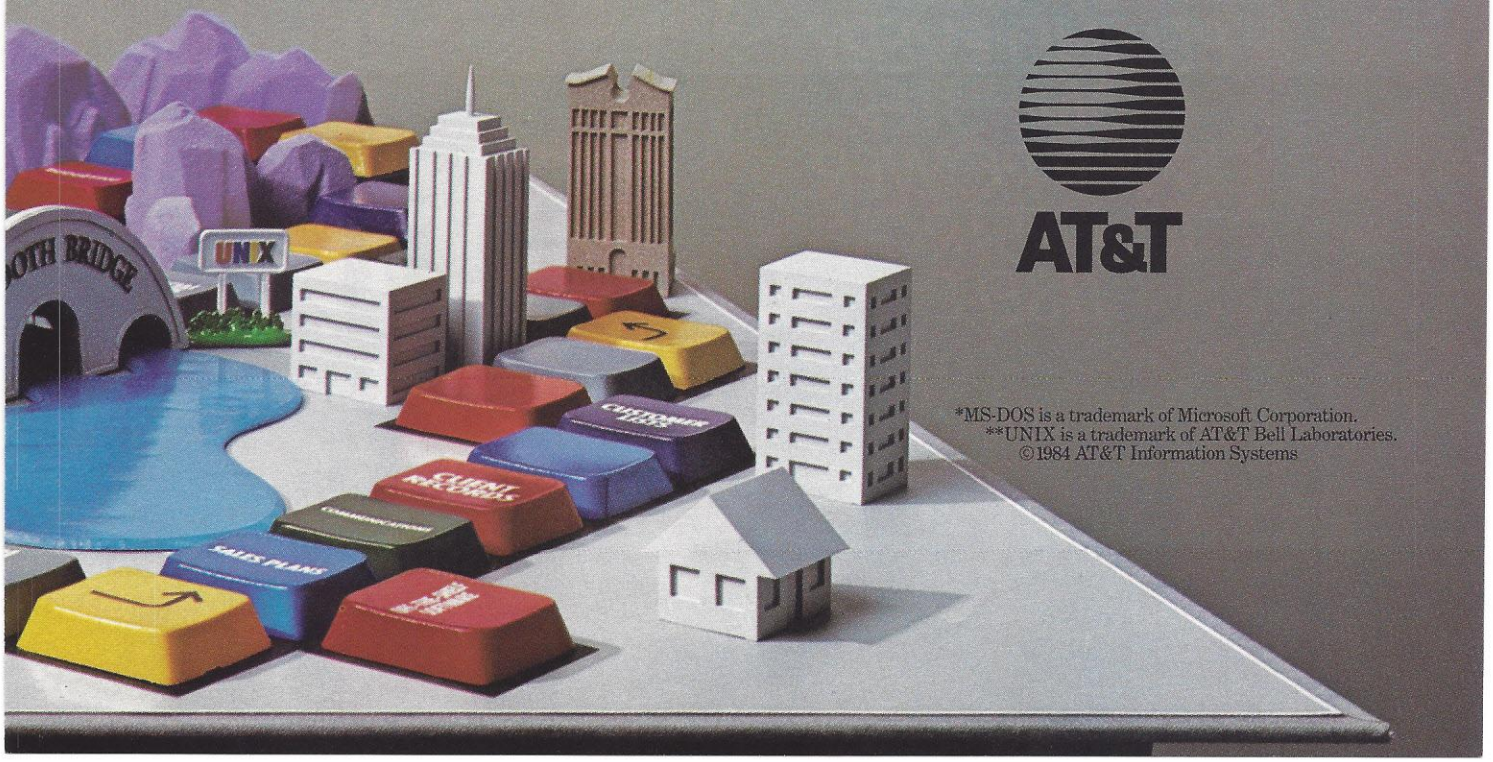
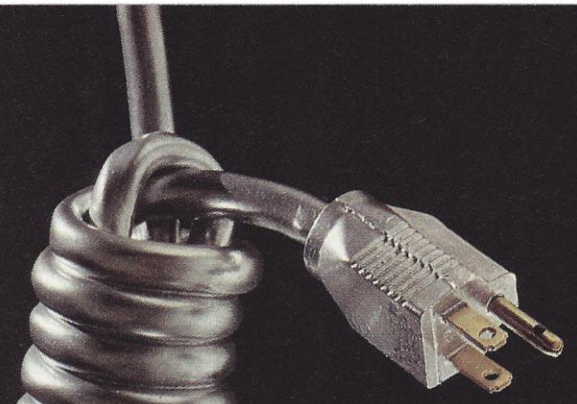


AT&T

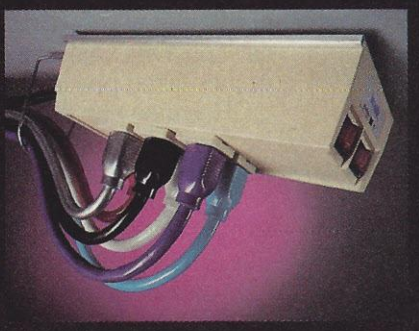
*MS-DOS is a trademark of Microsoft Corporation.
**UNIX is a trademark of AT&T Bell Laboratories.



That power cord may look innocent. But it could suddenly turn against your PC.

It could, for example, hurl a power spike from static or lightning into its delicate circuitry. Wiping out its memory. Or destroying a defenseless component.

Don't risk it. Get a 6-outlet Wire Tree Plus™ surge protector from NETWORX.™ It guards against spikes. Filters out RF interference. And it's the *only* device with two phone jacks to protect modems against surges.



Other unique features include separate switches for the CPU and peripherals and a bracket that mounts under the front of the workstation. The illuminated switches are easy to reach, and yet recessed, so you can't accidentally shut down power and lose data.

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CIRCLE 11

NCR ENTERS THE COMPATIBLE MARKET

by Christopher O'Malley, Associate Editor

NCR Corporation is one of the world's largest computer manufacturers, with revenues from sales of computer equipment and software totaling a hefty $1.8 billion in 1983. But in the way of personal computers, we haven't heard much from NCR—a company still largely perceived in its National Cash Register heritage of supplying checkout terminals to retailers.

NCR's new Model 4, an MS-DOS-based personal computer designed to be a close compatible to IBM's Personal Computer family, has been given the task of changing all that. The new machine's older brother, the Model 5, ran both the CP/M and MS-DOS operating systems but was not compatible enough with the IBM Personal Computer and its compatibles to take advantage of the thousands of business programs written for those machines. But the Model 4, says NCR's dealer product manager Bruce Langos, is hardware and software compatible with the IBM Personal Computer and is aimed squarely at the same corporate/business user with whom IBM has enjoyed so much success.

NCR's Model 4 is MS-DOS-based and is aimed at the same corporate/business user as IBM's Personal Computer family.

Not a look-alike

One of the things which separates the Model 4 from the pack of IBM work-alikes is that it is not a look-alike. The system's main unit, housing the CPU, a 12″ monitor and two vertical half-height floppy disk drives, is not small or light enough to be considered a transportable or even a "luggable" computer. But at 18″ wide by 15″ deep by 15″ high (excluding the keyboard), the NCR is a compact desktop computer.

The all-in-one design of the NCR Model 4 is reminiscent of Radio Shack's TRS-80 Model 4, oddly enough; but the NCR unit is more stunning than stodgy in appearance. The light brown face of the NCR computer juts out from an ivory cabinet, presenting a monitor to the left and disk drives and contrast/volume/power controls to the right. The NCR's "integrated design," says Langos, means less desk space for the computer and more room for you—a desire he says was expressed frequently by business people in NCR's market tests.

NCR's Model 4 is available in a variety of configurations resulting from combinations of one or two floppy drives, monochrome or color monitor and hard disk options. Prices range from $2400 for a single-drive monochrome unit to $4960 for a 10Mbyte hard disk model with color monitor and graphics board. NCR's "basic configuration" consists of a dual drive, monochrome display (without graphics capability) system which retails for $2825.

Both the monochrome and color monitor feature a standard 80 character per line by 25-line display. The monochrome monitor sports a green display while the color model can show up to 16 colors and has a maximum resolution (in black and white) of 640 by 200 pixels. The slimline drives, which have a handle-like door that engages the drive head, have an audible churn when they're reading from or writing to a disk, but the noise is not loud enough to be distracting.

All models of the NCR come standard with a somewhat miserly 128k (expandable to 640k) memory and RS-232 communications and parallel printer ports. Also included as standard equipment are Microsoft's MS-DOS 2.11 and GW-BASIC with all the appropriate documentation. The DOS disk, which the company labels NCR-DOS, has an excellent on-screen help feature for learning or reminding yourself how the DOS commands and files function. The DOS disk also contains a "RAM-Disk" utility that lets you set aside an area of RAM memory for data storage and then access those files much faster than if they were read from a real disk. Tutorial disks, called NCR Pal and NCR Tutor, and a user's diagnostic disk complete the included software.

IBM compatibility

The Model 4, like the IBM Personal Computer, relies on Intel's 8088 microprocessor to run its system. The Intel 8088 is not a "true" 16-bit processor in that it processes information in 16-bit quantities but must manipulate 8 bits of data twice in order to do so. This means the NCR Model 4 operates at the same speed as the IBM Personal Computer, a pace now considered a bare minimum among IBM-like personal computers.

How IBM-compatible is the NCR Model 4? NCR tests claim almost uniform compatibility with both hardware and software designed to work with the IBM. Tests per-

formed at NCR's request by Future Computing, a research firm, also indicate a very high level of compatibility. Our own compatibility tests proved no different.

Qualifying as an "IBM-compatible" makes a bounty of business software available to users of the NCR Model 4 but does little to distinguish NCR's system from a flock of others. The keyboard is perhaps the one performance area which distances the Model 4 from many of the IBM-compatible computers. The detached keyboard, though coil-cabled from the rear of the unit, provides a generous amount of flexibility for positioning the panel around the desktop. There's enough play in the cable to easily position the keyboard on your lap, but you may not want to—the 20-plus inch long keyboard might prove uncomfortable there. However, the generous length makes room for greatly appreciated extra keys. These extras are derived largely from the duplication of keys normally turned on and off with the number lock (or Num Lock) status key on the IBM-standard numeric keypad. The Model 4 has that standard numeric keypad to the extreme right of its panel, but also has second keys for cursor movement, insert, delete, home, end, page up and page down functions sandwiched between the alphabet and number keys. The NCR keyboard also adds second control and enter keys. The net result is a significant improvement on the standard keyboard embraced by most IBM-compatible machines.

The NCR Model 4, as the company has positioned the machine, is a solid alternative to the IBM Personal Computer and other compatibles. It offers a high level of compatibility, an attractive design and some real keyboard improvements. It does not, however, offer innovation. And with more IBM-like personal computers moving toward faster and more efficient circuitry while still clinging to compatibility, the Model 4 represents less than the latest technology. But NCR's new desktop compatible remains a formidable offering from a company with 100 years of machine-making behind it.

FOR MORE INFORMATION: NCR CORP., Dayton, OH 45479; (513) 445-2075.

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Sharing Computing Experiences

■ A Baseball Fantasy ■ Adoption Search ■ The Fun Of Learning

Dreaming With The Boys Of Summer

For one evening last summer, Tim O'Neil and thousands of St. Louis Cardinals fans lived a baseball fantasy on the banks of the Mississippi River.

It was Monday night, July 9 when announcers Jack Buck and Mike Shannon lent their radio skills to "The Dream Game," a computer-generated matchup between the 1967 World Series champion Cardinals and the 1942 championship team. The game was broadcast over KMOX radio on the night before the 1984 All-Star Game which was played in San Francisco.

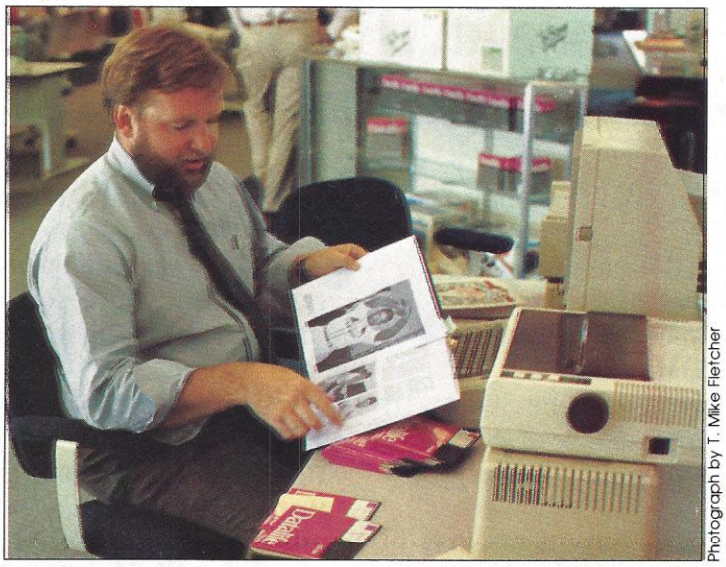
O'Neil, the marketing manager at Forsythe Computer, which operates five stores in St. Louis, designed and produced the computer-simulated game, the second in an annual series which is certain to continue as long as men lace up their cleats and take to the diamond with bats, balls and gloves. Next year O'Neil hopes to pit the '42 Cardinals against the 1927 New York Yankees (Babe Ruth, Lou Gehrig, et al), the team many experts consider the best in the history of baseball.

"Baseball to me is a universal language," O'Neil, 33, says. "There is something medicinal in listening to your favorite announcer leisurely call a baseball game. And I found that the game was a great vehicle to show people the power of personal computers. Ultimately, it takes the edge off people's skepticism about computers. They say, 'God, you did that with a computer?'"

First, O'Neil amassed performance statistics by picking through the archives at *The Sporting News,* the St. Louis-based weekly magazine which is called "The Baseball Bible."

"Working with *The Sporting News,* we rated the players offensively and defensively—those types of skills—on a 1 to 10 basis," O'Neil says. "The game was built on the parameters based on statistical probabilities. When you play these games on a computer you find patterns that emerge consistently."

The computer's task was to pick up on the trends and provide a play-by-play account of the game. O'Neil was able to set his Apple II in either automatic or manual mode.



Photograph by T. Mike Fletcher

Tim O'Neil designed and produced the computer-simulated game between the 1967 and 1942 St. Louis Cardinals teams.

"In manual, people were able to pretend to be the managers (Red Schoendienst in 1967 and Billy Southworth in 1942) and emulate the strategy," O'Neil explains. "For example, one manager could decide what he wanted his batter to do and the other manager would have to react with a defensive alignment. We then would enter those choices into the computer, hit Return and the computer would run through its mathematical probabilities and come out with the result.

"Part of the proba-

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bility scheme is built-in. For instance, rating the defensive abilities of these players," he says. "Let's say the player at third base is rated as a two (not very competent). Statistically you have a stronger probability for him to fumble the ball or make an error. Those factors work together to give me a result. However, the guy could be a two and not make an error in the game. But over time the statistics pan out."

Although the 1942 Cardinals club was depleted by call ups during World War II, the team included such outstanding players as Hall of Famer Stan Musial (now a St. Louis restauranteur), Harry Walker (a former manager of the Pittsburgh Pirates) and leftfielder Enos Slaughter. The 1967 club was a solid mixture of talented players including Bob Gibson (currently a pitching coach for the Atlanta Braves), Curt Flood, Orlando Cepeda, Roger Maris, Lou Brock, Shannon (one of the Dream Game announcers), pitcher Steve Carlton (now playing for the Philadelphia Phillies) and Tim McCarver (now a play-by-play announcer on New York Mets telecasts).

"The reaction was unbelievable," O'Neil says. "We did a call-in show before the game to find out who people thought would win."

In addition, scorecards were distributed to the public. In all, O'Neil spent about two months putting the project together, which included 80 hours of studio time, an afternoon for Buck and Shannon to call the game and an additional two weeks in the studio laying down crowd and game-related soundtracks.

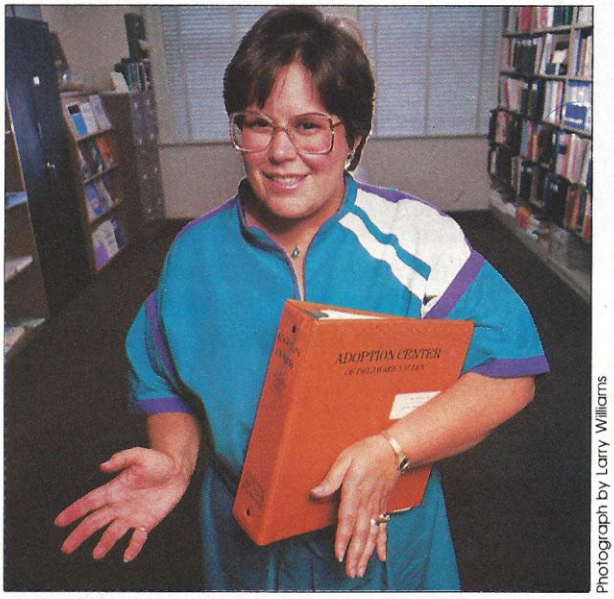
"Now there's a lot of interest from television stations who want us to reproduce the game for them," O'Neil says. "But we have problems in finding look-a-like players who can perform up to major league level."

Oh, yes, the 1942 Cardinals were the victors in the "Dream Game." Now, it's 'Wait 'Til Next Year' when O'Neil hopes to pair the '27 Yankees against either the '34 or '42 Cardinals.

Computerizing The Adoption Search

Matching prospective parents with a child who needs a home is the rewarding but often frustrating task assigned to government and private adoption agencies. There are many parents who would like to adopt a child, and an even larger number of children who need a home, but getting the two together—especially when they are separated by great distances—can be both a communications and planning nightmare.

The National Adoption Exchange (NAE), a non-profit group based in Washington, D.C., was established two years ago to help find solutions to the problems involved in adopting a child. What the NAE found is that personal computers and electronic mail services can help solve the problem of bringing parent and child together by helping adoption agencies communicate more efficiently. Using GTE Communication's Telenet system to access its Telemail electronic mail feature, the NAE puts its entire centralized bank of information on children and prospective parents on line for adoption agencies around the country to tie into.



Photograph by Larry Williams

Marlene Piasecki uses NAE listings in an effort to match children and families with greater success.

"The goal of any adoption exchange is to put information about the children and families who are waiting out there into a useable form," explains Marlene Piasecki, the director of the NAE. "The most useable fashion prior to telecommunications was photo listing books—a photo of a child and a description. The problem with photo books is that they're published all over the country and they're not organized in any way."

The Adoption Exchange, using Telemail's electronic message and "bulletin board" capabilities, lets NAE's member agencies scan listings of available children and awaiting families, retrieve or add to the listings, and send messages to other agencies through the system. The NAE listings cover a wide variety of child types and backgrounds, notes Piasecki.

"We had 10 years of experience running a regional adoption exchange," Piasecki says of her group, "and we knew that when you have numbers in the hundreds, a well-organized paper system can do your searching, matching and communication. Automation there is nice, but it's not essential. If you're talking in the thousands, then obviously you can't search through 1000 family records in an efficient way when a new child is registered."

The Exchange's bank of parent/child information is collected from participating state and private child welfare agencies across the nation and then fed into a TeleVideo personal

See what

+ 1984 Comedian's Convention
  – Location
  – Jokes about teenage children
  – Travel arrangements?
  – Invitations, coffee and donuts
  – New jokes about spouses
  – Get budget approval
  – Workshop: where to buy apparel wholesale
  – Jokes about new television programs

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+ 1984 Comedian's Convention
  + Location
    – Wonderama Resort Spa & Carwash
  + Travel Arrangements
    + Arrange air charter through travel agent
      + Lotsa Luck Travel Service, Las Vegas
        – Ida Mistit, agent
  + Agenda
    + Day 1
      + Workshops
        + new jokes about
          – your spouse
          – your neighbor

Use as many headings and as much text as you need to develop the outline fully. ThinkTank's processing power can move whole sections of text with a single keystroke—something no word processor can do.

+ 1984 Comedian's Convention
  + Location
    – Wonderama Resort Spa & Carwash
  + Travel Arrangements
    – Arrange air charter through travel agent
  + Agenda
    – Day 1
    – Day 2
  + Budget
    – Submit proposal by August 15
  + Publicity
    – Invitations
  + Room Reservations
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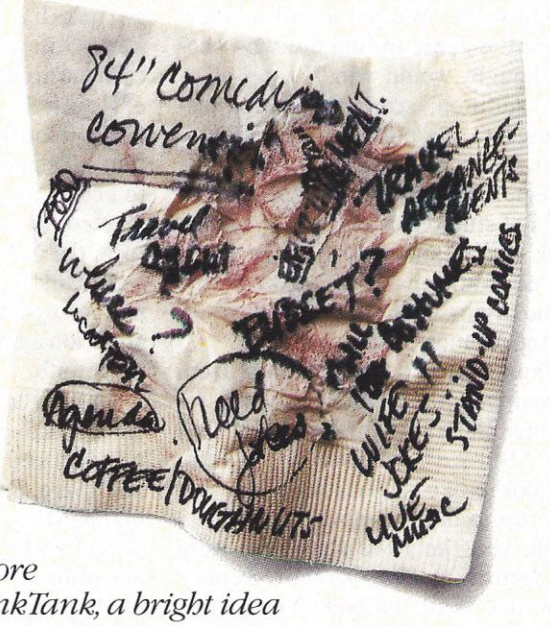

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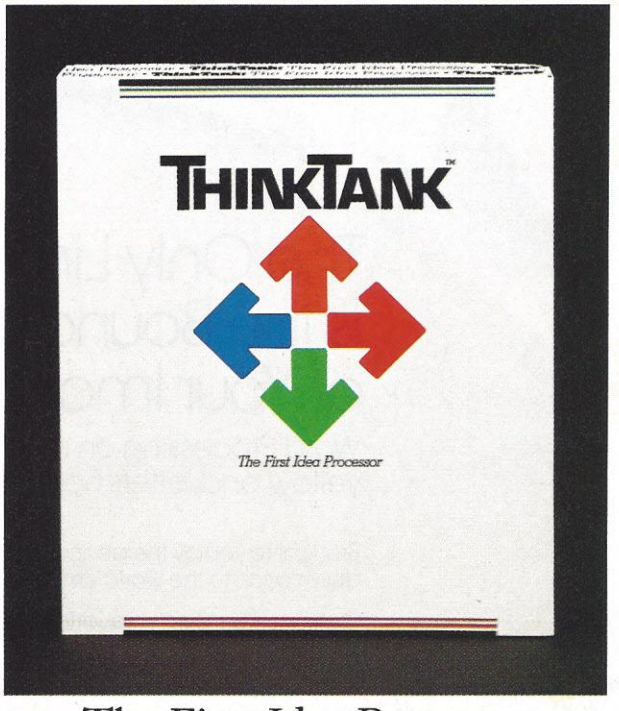

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computer equipped with a 20Mbyte hard disk drive. The TeleVideo machine, running a customized version of Ashton-Tate's dBase II information management program, keeps listings and descriptions of children available for adoption and families seeking to adopt a certain type of child. Another TeleVideo computer, two terminals, three printers and a modem also help the federally funded group gather and organize its volumes of information. GTE's Telemail service then permits NAE members to access the data base of adoption information using a series of menus provided by the NAE. The menu system allows agencies to narrow down the volumes of information.

When an adoption or child welfare agency finds a child listing which meets the criteria specified by one of the families it represents, the group notifies the NAE. The Exchange then forwards more complete information on the child, including the name and location of the agency that currently maintains custody of the child. The two adoption agencies, the agency retaining custody and the one requesting more information, then contact each other directly to work out details.

Individuals seeking to adopt a child must go through a government or private agency in order to gain the benefits of the NAE's data base service, Piasecki explains, since the Exchange is only available to licensed adoption groups. The NAE system has been on line for less than a year and consequently has a small number of member agencies. Piasecki also notes that obstacles like the high cost of computer equipment, bureaucratic red tape for government agencies, and a general resistence to new ideas have impeded the NAE information service from growing faster than it has.

More information on The National Adoption Exchange and its services can be obtained by calling (215) 925-0200 or writing the NAE at 1218 Chestnut St., Philadelphia, PA 19107.

A Computer Lesson In A Party Atmosphere

Over 600 women have found a new reason for small evening get-togethers. No, it's not for a dinner or card party, or even for the time-honored accumulation of Tupperware. They have been attending an innovative computer learning program—a "computer party" of sorts—offered in the New York City area by Laurel Gruenwald and Linda Cooper.

Gruenwald and Cooper are the founders of Interpersonal Software, a two-year-old company which offers women the opportunity to learn about personal computers at a low-key "Introduction to Computers" class in their own homes or the homes of friends. "We're trying to help women overcome their resistance in a non-threatening way," says Cooper. "We give them a place to start where they don't feel threatened like they might in a classroom."

Photograph by Larry Williams

Linda Cooper and Laurel Gruenwald offer women a chance to learn about computers in comfortable settings.

Gruenwald and Cooper's two-hour class includes such topics as software, how to create and use a program, how to set up and use the machine, important definitions, and the parts of a personal computer system. Participants get hands-on practice at inputting commands on a personal computer keyboard, working with simple programs and learning to link a console, printer, disk drive and monitor into a working system. The subjects covered vary according to the needs of each specific group.

The groups are small, usually numbering from about six to eight, and the atmosphere is relaxed and casual. The hostess of the session receives a 25 percent discount toward the cost of the class. Interpersonal Software will also work with husbands and wives or men by referral—but their primary focus is women.

The two women typically begin their class by asking the attendees why they want to learn about computers. A recent seminar included a bank executive who explained that it had been assumed at her company that she knew how to use a personal computer system.

The executive, new to her job, said that she had been handed some word processing work from a secretary about to leave on vacation. Later she saw that the work contained errors and asked her boss what to do. "Just input the corrections yourself," he said. She had to admit to him that she didn't know how. Her boss strongly suggested that she enroll in the bank's in-house computer-training program. She agreed, but wanted to get a head start on her own first in an atmosphere she found less formal, less intimidating.

The banker's story helps illuminate the difficulties that female executives,

and executives in general, may have in coming to grips with personal computers at work. Yet there has been no one typical reason given for attending the class, says Cooper. "The diversity (of the women) has been a fascinating part of the classes for us," she says.

Many of the women, like the bank executive, feel that learning about computers will help them in their careers. Others are students who realize that knowing how to use a personal computer will give them an advantage in pursuing a career goal. Some want to utilize computers in part-time businesses; others want to use the computer to teach their children at home. Still others see their children learning about computers in school, or their husbands using them at work, and want to keep up with what's being learned. Many women, suggests Cooper, feel that learning about computers is becoming more "necessary in life." "They are afraid that they will be left behind if they don't catch up soon."

Interpersonal Software has attracted its clients largely by word of mouth. When the company was in its beginning stages, "We hung signs at the local grocery and health food stores and did a presentation for a mother's center," says Cooper. "When we got our first paying customer, we didn't want her to be the only person, so we had some friends fill out the class."

Until several years ago, Cooper and Gruenwald both knew little about computers. They were employed as therapists for autistic children and wanted a change of careers. The two women decided to try to market and sell a kit Cooper had created that was designed to help teach autistic youths about basic body movement. Response to the kit was positive, but the cost of reproducing it was high. Transforming it into a software program seemed the most logical and cost-effective way to recreate the package.

Cooper and Gruenwald decided to dive right into their project. They left their jobs and spent their time learning about personal computers and how to create a program. "We really knew nothing," says Gruenwald, "we had to start at the beginning." "We worked like nuts—we barely took lunch," adds Cooper. The two worked on their own, read computer books, and worked part-time with a consultant. The result was a software program, written in the FORTH language, which uses graphics, color-coordination and music to aid learning. Some of the graphics use a flashing effect for greater eye-appeal. The program, Body Basics, is available from Dynacomp, Inc., a Rochester, New York-based distributor.

The experience also yielded an important insight—"We began to move into teaching when we realized that none of our friends knew anything about computing, while we were having fun with it," says Cooper. They had learned that personal computers didn't have to be frightening or intimidating, and they were ready to give other women the same message.

"We're finding that there is a need (for this type of training) all over . . . we're getting calls from all around the country," says Gruenwald. To meet this need, Interpersonal Software has grown considerably and Cooper and Gruenwald are expanding their training to women's organizations and to the corporate level, particularly in training bank personnel. A follow-up "Introduction to Computers II" home class is being planned, as is expansion beyond the New York City area.

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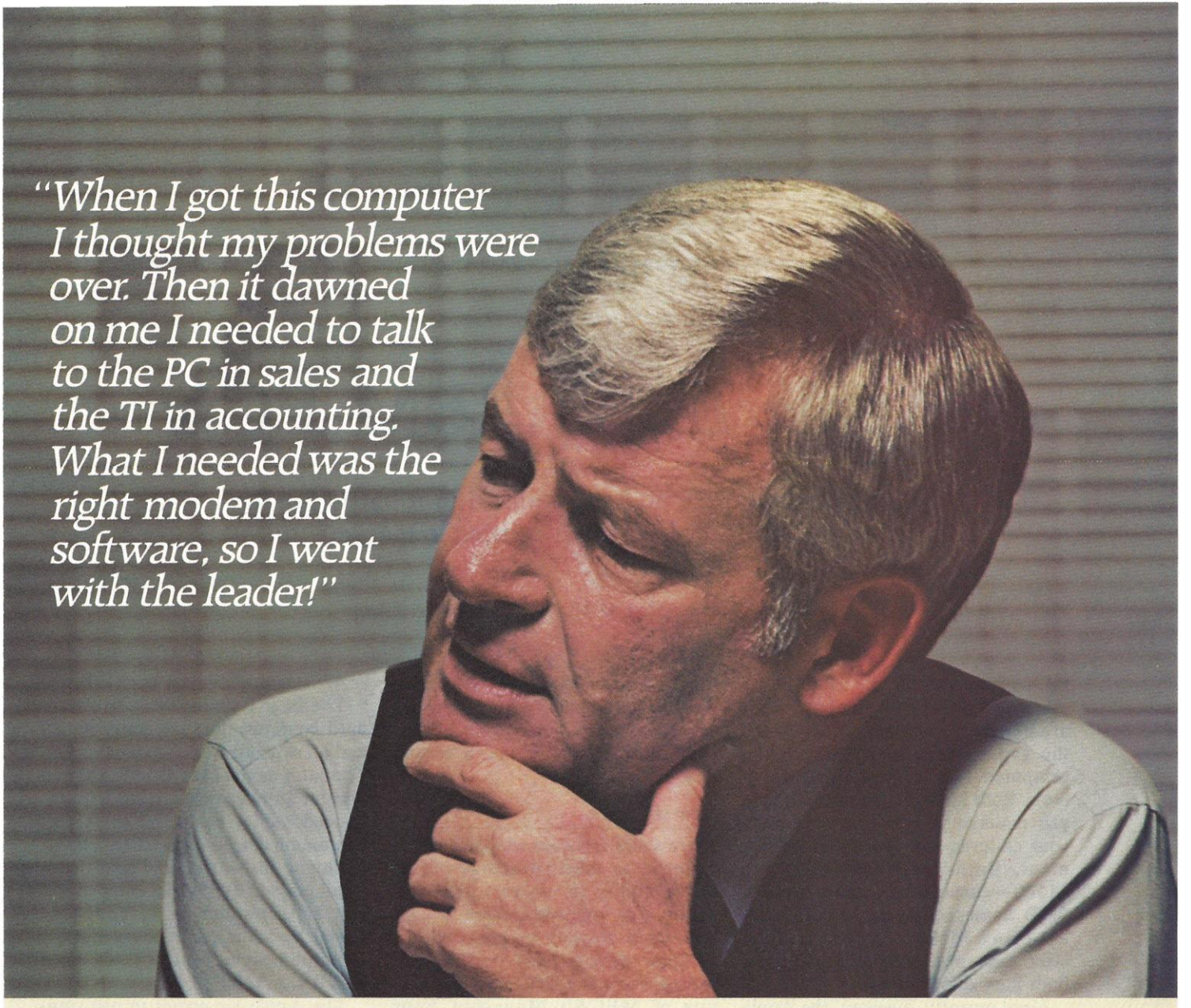
And that's not all! Smartcom II also emulates the DEC VT100 and VT52 terminals, now in widespread use in many businesses. This feature lets your personal computer "pretend" it's a DEC terminal, opening the door to a vast installed base of DEC minicomputers!

We stand on protocol.

In addition to the popular Hayes Verification protocol, the new Smartcom II also includes the XMODEM protocol, ensuring accurate transmission to a wide range of personal computers and mainframes at information services. By matching the protocol (or "language") of a remote computer to yours, Smartcom II can transmit information error-free, regardless of interference on the phone lines.



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CIRCLE 41

Apple *IIc* Vs. IBM PC*jr*

IBM and Apple go head-to-head in a battle for the midrange personal computer market

by Christopher O'Malley, Associate Editor

The Apple IIc or the IBM PCjr, which one should you buy? Both are powerful machines which bridge the gap between inexpensive home computers and business-oriented systems. Both have the potential to help you manage your business, educate your children and provide entertainment. Both cost from $1000 to $1500—considerably more than a $300 home computer, significantly less than a $3500 office system. Both offer their own kind of advantages, both have disadvantages.

Until recently, however, the Apple IIc enjoyed an edge over the PCjr. Introduced last November, the PCjr drew national attention, but much of it negative. Its chiclet-style keyboard and limited compatibility with the IBM Personal Computer gave astute shoppers reason to pass it by. But in the past few months, IBM has introduced "fixes" to the jr, fixes of the kind which put it head-to-head against Apple's IIc.

The original PCjr keyboard, equipped with hard rubber keys, or chiclets, has been replaced. The new keyboard, with 62 typewriter-style keys, is now standard and will be available to owners of the old keyboard at no charge—you simply exchange the old one for the new one. You'll also be able to expand the jr's system to 512k RAM with the new 128k memory expansion attachments. Included with the purchase of those attachments is an "electronic disk" program, or RAM disk which lets you allocate some or all of that extra memory to act as a second disk drive.

New software

There's new software which has been designed to take advantage of the PCjr's ability to use cartridge programs. For creativity, there is ColorPaint, a drawing program with a 16-color palette. For personal finances, there is a disk/cartridge version of MECA's Managing Your Money. And for business productivity, there's a dual cartridge version of Lotus 1-2-3.

The net result of these hardware upgrades and software additions is to make the PCjr a more comfortable and expandable machine, one more compatible with other members of the IBM personal computer family. What that means is that the PCjr will run more of the personal productivity and business software designed for the IBM Personal Computer.

On the other hand, the Apple IIc is a slick, compact and compatible newcomer to the Apple II family, a family which brings with it the greatest variety of software for any personal computer.

To help you decide between the Apple IIc and the IBM PCjr, we'll take a close look at both the upgraded PCjr and the Apple IIc and how they really stack up against each other.

The PCjr is available in two standard configurations: an entry model and an expanded or enhanced model. The entry model has 64k of RAM and lists for $599 at this writing. The enhanced model has 128k of RAM, 80-column display capability, a built-in floppy disk drive and sells for a retail price of $999. The entry model can be upgraded to an enhanced model by adding a memory/display expansion circuit board ($140) and a disk drive ($480).

The Apple IIc comes in one standard configuration, consisting of CPU, built-in floppy disk drive, external power supply, RF (radio frequency) modulator for hooking up the computer to a TV, video display cable, 80-column display capability, tutorial disks and three small manuals. The package retails for $1295.

Software and compatibility

Compatibility—whether programs written for other Apple II's will run on the IIc, or software written for the IBM Personal Computer will run on the PCjr—determines what they will and will not be able to do. The IIc's and PCjr's degree of compatibility with their larger cousins is also an important consideration if you need to transfer software and data from the bigger machines. The amount of software available for the machines is a critical issue (see "Four

There is a great variety of software for both machines, but the Apple II line offers greater overall selection.

Programs—See How They Run").

The PCjr, with its new memory options in place, should provide closer software compatibility with the IBM Personal Computer, although not to the extent—as yet—of the IIc and IIe. Much of the productivity-oriented software written for the IBM Personal Computer requires RAM memory beyond the PCjr's standard 128k and some of these packages also require two disk drives. Adding memory attachments to boost the PCjr's RAM and using the supplied RAM disk as a second drive should solve some—but not all—of these compatibility problems.

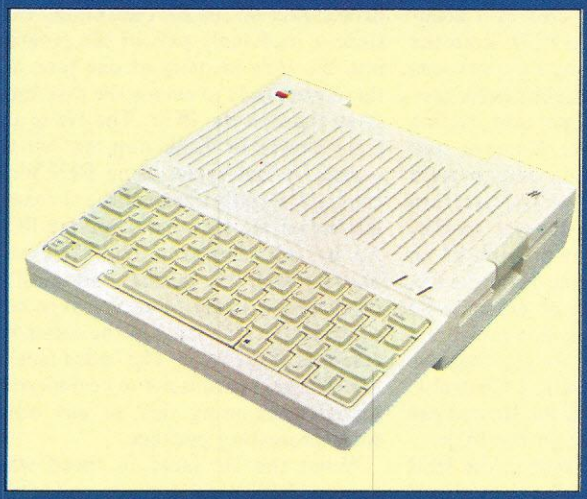
Apple estimates that as many as 16,000 programs are available for the Apple II series, while IBM says there are between 5000 and 6000 packages currently offered for the IBM Personal Computer family—about 1000 of which the company claims will run on the 128k PCjr. The 256k PCjr will run about 2000. In other words, while there is a great variety of software for both machines, the Apple II line clearly offers greater overall selection.

Critical differences

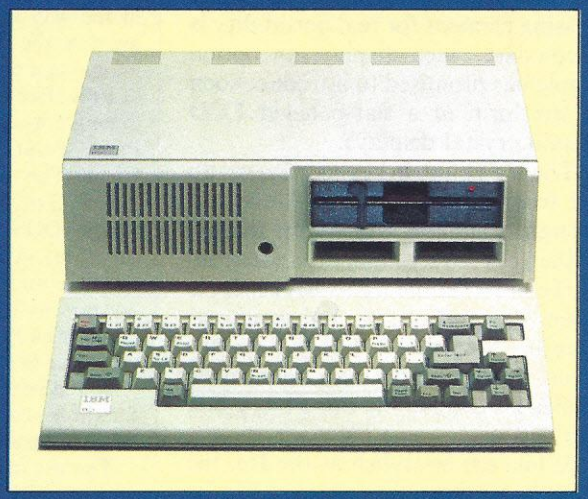
But numbers often mask deeper truths. Not many users will run dozens of different programs, much less thousands of different programs. The type of software then, and its availability, are as important as the number of programs available. Here the differences between the IIc and PCjr are critical.

While both the IIc and the PCjr run productivity, education and entertainment software, the IIc's greatest strengths lie in education and entertainment. In fact there are very few education or entertainment packages that don't run on the Apple II line. There is also a significant base of productivity and business-oriented software for the IIc—including Apple's own AppleWorks and Apple Writer, Software Publishing's PFS series, Multiplan and VisiCalc. However, programs like WordStar and dBase II, available on the Apple IIe by adding a CP/M card, can't be used on the "closed" IIc.

While the PCjr has a smaller base of education and entertainment programs, it surpasses the IIc in the number of business and productivity packages it can run. The PCjr's ability to run a considerable number of the business programs designed for the IBM Personal Computer makes it valuable if your goal is to transport work to and from the office—the environment where PC-DOS and MS-DOS computers currently reign supreme. With



Name: Apple IIc
Dimensions: 11.5″ wide by 12.2″ deep by 2.5″ high
Operating System: AppleDOS 3.3/ProDOS
Microprocessor: 1.02 MHz 6502
RAM: 128k
Disk Drive: 143k slimline floppy
Keyboard: built-in, 63 keys
Display (optional): monochrome, composite color, RGB
Expansion ports: 7



Name: IBM PCjr
Dimensions: 13.9″ wide by 11.4″ deep by 3.8″ high
Operating System: PC-DOS/MS-DOS
Microprocessor: 4.77 MHz Intel 8088
RAM: 128k (expandable to 512k)
Disk Drive: 360k slimline floppy
Keyboard: detached, 62 keys
Display (optional): monochrome, composite color, RGB
Expansion ports: 12

enough memory in place, the PCjr should be able to take advantage of the latest in business software. In addition, Lotus' decision to put 1-2-3 in cartridge form for the PCjr may signal a new level of support for the PCjr and its cartridge capabilities—making it not only possible to run powerful business software on the jr, but easier and less costly as well.

Appearance

The IIc's styling is strikingly different. An ivory colored unit (Apple calls it "snow-beige") with tan keys, the IIc is remarkably small at only 11.5″ wide, 12″ long and 2.5″ high. It is also lightweight at 7.5 pounds, although that does not include the somewhat weighty power supply. Apple calls the IIc a transportable, which means that while it can be carried from one place to another with little effort, it is not quite compact enough to use on your lap on a transcontinental flight. The missing element for real portability is a compact video display, an option Apple has promised to introduce soon in the form of a flat-paneled LCD (liquid crystal display).

The IIc's built-in keyboard takes up the front third of the unit's face and is slightly sunken, which puts the top of the keys barely higher than the rest of the unit. On the unit's back side, is a small on/off switch and seven expansion connectors. The RF modulator, power supply and connecting cables all feature the same ivory and tan design.

While not as stylish as the IIc, the PCjr is an attractive computer in its own right. At 14″ wide, 11.5″ long by 4″ high and weighing a little over 8 pounds (without keyboard), the PCjr shares—in part—the IIc's advantages of compact size and transportability. Like the IBM Personal Computer, the PCjr is off-white in color, but much darker than the brighter ivory color of the IIc. At the back of the unit are the on/off switch and twelve connectors with space for a thirteenth.

FOUR PROGRAMS—SEE HOW THEY RUN

PFS:Write. PFS:Write, Software Publishing's popular word processing program, performs reasonably well on both the IIc and the PCjr, but seems more at home on the IIc. PFS:Write's transition from the IBM Personal Computer to PCjr, which has 21 fewer keys than its big brother, is not as smooth as it is between the Apple IIe and the IIc (which have the identical 63 keys).

Loading the program is a two-step process on the PCjr. You must first load your DOS 2.1 disk and then type "write" after the A> prompt to get the main menu to appear. Unfortunately, PFS:Write does not enable DOS to be installed onto the program disk (thereby making it self-loading) using PC-DOS 2.1, since there is not enough space on the program disk. PFS:Write on the IIc boots automatically and presents the main menu.

There are some differences, though, in the way PFS:Write creates a document on the IIc and the PCjr. Both the main menu on the IIc and PCjr versions of PFS offer five simple choices for producing a document: Type/Edit, Define Page, Print, Get/Save/Remove and Clear. The IBM version adds a sixth choice, Exit, which allows you to return to the DOS disk (or to run another program). A help screen prompt, F1 on the PCjr and Open Apple-H on the IIc, appears at the bottom of either main menu. The PCjr version also provides a reminder that F10 will let you continue once you've made a selection. Control-C forwards you along with the IIc and can be used instead of F10 on the PCjr.

The use of function keys in the IBM version of PFS:Write is clearly designed to correspond to the IBM Personal Computer's 10 separate function keys. Without these keys, PFS:Write requires two keystrokes on the PCjr—the "Fn," or function key and then the appropriate number key—to execute these commands. The PCjr's F10 for continue and F1 for help, therefore, offer no real advantage over Control-C and Open Apple-H (also two keystrokes) to perform the same functions on the IIc. Some of the function keys on the IBM version of PFS:Write serve dual purposes when used with the shift key, which means you'll need three awkward keystrokes (shift-Fn-number) to initiate these commands on the PCjr.

PFS:Write commands are more straightforward and logical on the IIc. Control-W on the IIc will delete a word, for example, while the PCjr needs shift-Fn-5 to do the same thing. Likewise, Control-E erases a line on the IIc while the PCjr uses shift-Fn-6. Not all commands on the PCjr are so cumbersome, and PFS makes good use of the IBM's PgUp (scrolls a page up), PgDn (scrolls a page down), Home (goes to beginning of document), End (goes to end of document) and Insert keys. The four arrow keys on the PCjr, positioned in diamond fashion, are a little easier to use for cursor movement than are the straight row of arrow keys on the IIc.

Getting around the PFS program is a little slower on the IIc than on the PCjr since it loads only part of the program into the IIc's memory at one time and therefore needs to access the disk more often than on the PCjr. The IIc is also a bit slower in displaying text on the screen. A fast typist using PFS:Write could get slightly ahead of the character display on the IIc—not so on the PCjr. To be fair, however, the IIc's keyboard—with its tactile and audible response—is likely to let you type considerably faster than will the softer key response of the PCjr. The "good feel" of the IIc's keyboard is not to be underestimated when using this, or any other, word processing package.

What the IIc lacks in speed when running PFS:Write is made up for with self-loading convenience, easy to remember commands and a smooth keyboard that makes it easier to type a lot of information.

Lode Runner. Lode Runner, a popular arcade-like game from Broderbund Software, comes in IBM and Apple II versions each of which run well on the PCjr and IIc, respectively. Both versions look much the same, with you as a Galactic commando infiltrating the treasury rooms of the evil and cruel

Speed is perhaps the one element which really differentiates the use of Multiplan on the PCjr and IIc.

Bungeling Empire.

Lode Runner, when first loaded on either the IIc or the PCjr, automatically begins a self-playing demonstration to provide a feel for the game. Pressing any key on the keyboard or a joystick button starts the game. The PCjr version of Lode Runner plays noticeably faster at first, but this amounts to neither help nor hindrance in winning the game since the guards—as well as you—step livelier. Furthermore, both the PCjr and IIc versions let you use the left and right arrow keys to slow or quicken the pace of the game to taste.

Joystick operation on either game version is tricky unless you're an old hand at the throttle. Maneuvering from the keyboard offers a crisper sense of movement, especially on the IIc. The PCjr's keyboard, retaining a certain degree of the soft response that characterized its original panel, makes playing Lode Runner more difficult. You have to hit the keys quite hard on the PCjr to ensure accuracy of movement, a routine that can be quite tiring after a while. However, the PCjr version does allow you to designate any six keys for game play—on the IIc you must stick to the preset cluster of six keys.

In terms of longevity of interest, the PCjr version of Lode Runner has an edge. Both programs offer 150 game boards and let you design your own game screens as well. Should you get bored with all of them, however, the PCjr version of Lode Runner gives you 1500 "playable levels" by repeating the 150 game boards at increasing degrees of difficulty.

Flight Simulator. Flight Simulator, one of the top selling programs for personal computers, runs well on both the IBM and Apple families. The Apple version is from Sublogic, a firm led by Bruce Artwick, who wrote the program. Microsoft adapted it for the IBM Personal Computer family.

The superior processing speed of the PCjr gives its Flight Simulator program the edge over the IIc version. The Apple's screen updates are slower and produce a noticeably more pronounced "frame flicker" as you fly along. The PCjr, therefore, seems more responsive to control input—smoother, yet just as tricky to maneuver aloft or for landing. When flying low and taxiing, however, the graphics are distorted and compressed equally in both versions. The IBM version's screens do seem to slow down on landing approach. (The current Microsoft version lets you use "boosted" RAM in the PCjr, if you have it, to further enhance the program's flight performance.)

There is considerably more scenic detail in the IBM version of Flight Simulator; Apple flyers, for instance, will find no

The Flight Simulator Program runs faster on the PCjr than on the IIc.

Statue of Liberty in New York harbor as they cruise over in a Piper Cherokee with fixed landing gear. The IBM version has Miss Liberty in full regalia, right up to the flame on the torch, and its Cessna aircraft emulation includes retractable wheels.The Cessna's high-wing format is another advantage for the IBM version of Flight Simulator; the low-wing on the Apple version's Cherokee obscures landmarks when you're "looking" out to either side.

Flown with a joystick as the control column—the ideal way to operate the simulation—there is not much difference between the two versions in a pilot's "keyboard ergonomics." Throttle controls, flaps, etc., have identical or nearly identical locations. Following a "not" landing approach, however, Apple jockeys have an easier time hitting the brakes: the IIc's space bar. On the PCjr, the pilot has to find the period key. But all told, richer detail and less distracting image update give the PCjr the nod.

Multiplan. Neither the Apple II nor MS-DOS versions of Multiplan, Microsoft's electronic spreadsheet program has been designed or particularly enhanced for the IIc or the PCjr.

The MS-DOS version running on the PCjr comes with an installation disk for configuring the program to the hardware components of your computer; once configured and "installed" on your program disk, Multiplan is ready to self-load on the PCjr. The Apple version running on the IIc requires you to configure your program on a "boot disk" which you must load each time before using Multiplan.

Beyond loading procedures, Multiplan versions on the IIc and the PCjr are, for the most part, identical. Both program versions present a total worksheet space of 63 columns by 255 rows. And both versions display (in 80-column mode) the spreadsheet in seven-column by 19-row portions. Windowing, or viewing different parts of the Multiplan spreadsheet simultaneously, is possible on either machine. The command menu at the bottom of the screen offers the same 20 options on either computer.

What's different? Some of the commands used for maneuvering around the spreadsheet will vary, though the four arrow keys on both the IIc and the PCjr serve as the primary directional keys. Most of the command differences arise from the MS-DOS version's use of function keys and special keys like Home and End which the Apple IIc does not have. The PCjr's Home key brings you to the first cell (row and column position) on the worksheet, the End key sends you to the last cell of the sheet, PgUp scrolls a page up and PgDn scrolls down a page, etc. The IIc uses either the Control or Open Apple keys to achieve the same results. Since you have to hit two keys on the PCjr to activate most of these special functions there is usually no time saved

Speed is perhaps the one element which really differentiates the use of Multiplan on the PCjr and IIc. The PCjr loads, saves and recalculates a healthy-size spreadsheet faster than the IIc.

—Christopher O'Malley

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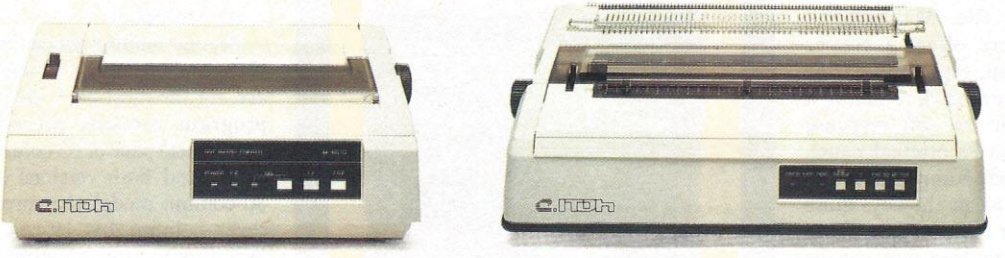

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CIRCLE 77

The IBM PCjr's original chiclet—style keyboard, had the dubious distinction of garnering more attention than any keyboard ever introduced. Its widely spaced, poorly labeled, rectangular blocks of white plastic made it ideal for complete keyboard overlays but nearly impossible to use for touch-typing. The new keyboard keeps the same general layout and 62 keys as the old one, including the benefits of oversized Enter and Shift keys, but replaces the "chiclet" keys with standard typewriter keys.

The IBM PCjr's original chiclet-style keyboard (top) has been replaced with a typewriter-like model.

The 62 keys of the PCjr are designed to provide all the functions of the 83-key IBM Personal Computer, using the PCjr's separate Fn and Alt keys to produce the effect of keys not on the jr's keyboard. Pressing the Fn key and then hitting one of the number keys, for example, will produce any of the 10 separate function keys on the IBM Personal Computer. The keyboard, like its predecessor, is cordless and uses an infrared beam to transmit keystrokes to the computer. The infrared connection can be more trouble than it's worth, however, since you have to be close enough to see the video screen anyway, and the beam is too wide when pushed against the CPU for the signal to be detected. The same flat cord available for the old keyboard will solve the problem but, as before, will cost you an extra $20.

The feel of the new PCjr keyboard, while improved over the old version, is still slightly soft, but adequate for touch-typing. If you prefer a sharper, tactile response, Apple's IIc is more likely to appeal to you. The carrying handle on the IIc can also be folded underneath the unit to provide a comfortable typing angle.

Video display

The video display, as mentioned earlier, is not included as standard equipment with either the IIc or the PCjr. With the RF modulator included with the IIc, or the $30 TV connector offered by IBM, you can use your television for display. While the TV is suitable for most entertainment and game software, applications like word processing and spreadsheet use will require an 80-column display and the increased resolution of a computer monitor.

For the IIc, Apple offers a mono-

OTHER CHOICES IN THE SAME RANGE

Other computers in the IBM PCjr/Apple IIc price/performance class compete for your dollar—mainly the Apple IIe, as well as the Radio Shack TRS-80 Model 4, Kaypro and a host of lesser-known lights.

The Apple IIe's sales still exceed those of most other computers, including both the IIc and PCjr—and the IIe costs about the same when comparably equipped. But it provides a critical difference: massive expandability. You can hang stuff on a IIc and a PCjr up to a limit, but the IIe may be the most protean personal computer ever made. It comprises a spacious box with a snap-off lid covering eight internal expansion slots, into which a staggering array of devices may be inserted, including interfaces for hard disks, local area networks, scientific data acquisition and control devices, even robots. You can also plug in internal clocks, alternate processors, extra RAM (up to a 512k limit), bubble memory cards (that stay on indefinitely even with the power off). Most Apple II series software can't directly access more than 128k, but the extra memory can be configured as incredibly fast phantom disk drives; or as a printer or modem buffer to let you do two tasks simultaneously.

The PCjr's optional RAM can also be used in the above ways. And it can be addressed directly by many programs—a marked advantage—but buying that RAM will cost plenty and for many applications the IIe's ability to use hard disk drives outweighs it. You need direct-access RAM to run large integrated multifunction programs. But popular smaller ones, like Appleworks, do run on the IIc and IIe.

Other computers in the IIe/IIc/PCjr price range—like the Radio Shack and Kaypro models—are almost all 8-bit Z80-powered 64 to 128k machines comparable in power to Apple II series computers, but with inferior graphics/color capabilities, very little entertainment or educational software and very little expandability. But if your needs are all business-oriented and you can predict what you'll be doing with computers two years from now, they offer a lot of value in generally compact packages.

—Lee Thé

The PCjr's maximum graphics resolution of 640 by 200 pixels in four colors easily betters the IIc.

chrome (green-screen) monitor, called the Monitor IIc for $199. The Monitor stand, which is necessary to prop the 9″ screen over the IIc's heat vents, sells for $39. There is no color monitor specifically made for the IIc yet, though it can use the company's new AppleColor Monitor 100 ($599) with an adaptor. The PCjr has its own color display for $429. A connecting cable to hook the IBM Personal Computer's color monitor to the PCjr costs $20. No monochrome monitor for the PCjr has been offered yet by IBM.

Monitor options for both machines extend beyond what Apple or IBM market themselves. The PCjr and IIc both have a standard RCA jack-type connector for composite monochrome and color monitors and a video expansion port for connecting an RGB (red, green, blue) color monitor. Third party vendors, including NEC and Taxan, provide a variety of choices if you require something other than what is currently being offered by IBM or Apple.

As for the display capabilities of the computers themselves, the PCjr and IIc offer similar text display, with the IIc displaying a maximum of 80 columns across by 24 lines down and the PCjr showing 80 columns by 25 lines. In graphics display, the PCjr has a clear edge. While the IIc adds an "ultra-high" resolution graphics mode (560 by 192, monochrome only) to the Apple II's normal low- (40 by 48, 16 colors) and high-resolution (280 by 192, six colors), the PCjr's maximum graphics resolution of 640 by 200 pixels (dots) in four colors easily betters the IIc in graphics output.

Operating system

Both machines have new operating systems. The IIc runs an improved version of AppleDOS 3.3 called ProDOS and the PCjr uses PC-DOS 2.1, an upgraded version of IBM's PC-DOS.

In addition to ProDOS, which is included with the IIc, Apple's IIc will run AppleDOS 3.3 and most programs using that DOS. ProDOS and AppleDOS are not completely compatible, but a utility program allowing you to convert files from AppleDOS to ProDOS is available on the new operating system disk.

The PCjr's PC-DOS 2.1, IBM's proprietary version of Microsoft's MS-DOS, costs an additional $65. This 2.0 upgrade, the latest release before PCjr's debut, has been slowed to accommodate the different pace of the PCjr's half-height disk drive. As a result, the PCjr only operates properly with 2.1 and should not be run using PC-DOS 2.0 or earlier versions. This should present few real compatibility problems between the IBM Personal Computer and a PCjr since PC-DOS 2.1 is becoming standard for the IBM Personal Computer and its workalikes.

The BASIC programming language is available for both the IIc and the PCjr, with the IIc using a dialect called Applesoft (as do other Apple II's) and the PCjr using a version of

A RAM DISK FOR THE IBM PCjr

In providing options for increasing the RAM or internal memory in the enhanced PCjr, IBM decided to offer a "RAM disk" program with the purchase of a 128k memory expansion attachment. What is a RAM disk and why would IBM want to include one?

RAM disks aren't physical entities like a floppy or hard disk. Rather they are programs which let you use a portion of the computer's RAM (random-access memory) to store information like a floppy. A delineated portion of RAM is labeled—typically as "Drive C"—and you can then load multiple files into that "drive" and manipulate them just as you would files on a real disk. A directory or "dir" command in both MS-DOS and CP/M, for instance, will yield a list of all the files residing in the Drive-C area of RAM.

RAM disk software, in effect, creates a floppy disk drive that has no weight, takes up no room, has no moving parts to fail and costs (other than the program's price) nothing. Information stored on a RAM disk, however, must be saved to a real floppy disk *before* turning off the computer. If you don't, those files will vanish.

What's the advantage of all this? Speed is one benefit. A RAM disk will allow you to load the entire WordStar program, for example—which normally loads only partially into memory and then must access the disk for additional commands—into RAM. Every disk access needed by the program then takes place at the speed of integrated circuits rather than at the mechanically limited disk drive pace. But while programs that access a disk frequently will show a noticeable performance gain, those similar to Lotus 1-2-3—which loads all of its program files and working spreadsheet into RAM—will show minimal or no speed difference.

But RAM disks have another advantage besides speed. A RAM disk can also be used as a temporary disk drive or, in the case of the IBM PCjr, as a second disk drive (the PCjr has no provisions for adding a second real drive). With the RAM disk program included on the Memory Options disk that comes with the memory expansion attachments, the PCjr should be able to run much of the software which requires two disk drives on the IBM Personal Computer. Thus, IBM's aim in providing PCjr users with a RAM disk is to hurdle the nagging "family compatibility" obstacle at minimal cost.

RAM disks for the Apple IIc are also available and Apple's new ProDOS operating system even includes a disk emulation program. Other RAM disk packages for the Apple, which offer additional utilities for things like copying a disk with a minimum of disk-swapping, include DiskQuik ($29.50) from Beagle Bros. of San Diego, Calif. and RAM-Drive e/c ($29.95) from Precision Software of Milwaukee, Wisconsin.

—James E. Fawcette

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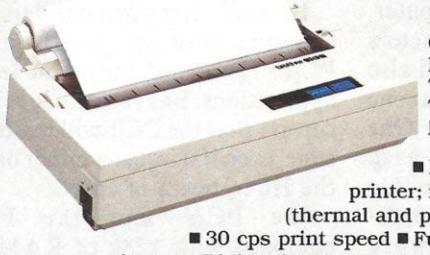

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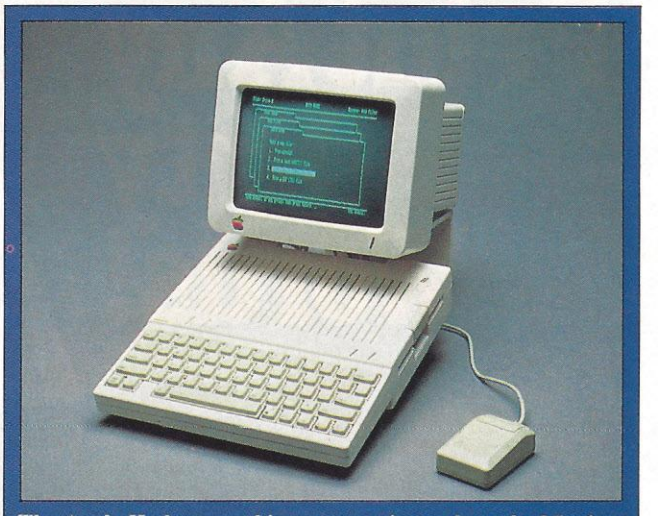
CIRCLE 1

The PCjr, here running IBM's new ColorPaint program, has an optional color display and can use a mouse pointing device.



The Apple IIc has matching accessories such as the Monitor IIc and the AppleMouse which plug into the rear of the unit.

Microsoft BASIC labeled BASICA (as does the IBM Personal Computer). Applesoft is built into the IIc's ROM, or permanent memory. The PCjr has a small part of its BASIC built into ROM, with the rest on a cartridge program which sells for $75. To run anything other than simple BASIC programs on a cassette recorder with the PCjr you will need the cartridge.

On the inside

The inside of the Apple IIc is a place you'll probably never see since the CPU is sealed shut. In fact, Apple went to great lengths to keep you from wanting to open the unit by providing plug-in openings in the rear of the machine for most of what it claims you'll ever want to add on. But what's inside the closed computer is important even if you can't see it because the IIc's performance traits rest within the hidden circuitry.

The IIc is powered by a variation of the 8-bit microprocessor used in the other Apple II computers, the 6502. The IIc's processor, called the 65C02, is a low-heat version that can work with less electrical power (presumably to enable future use with battery packs or other low-power sources) and can stand up to the stress of operating within such a compact unit. The IIc processor operates at just over one megahertz (1.02 MHz), or one million cycles/pulses per second—the same clock speed registered by the Apple IIe.

The PCjr also uses a familiar microprocessor. The 16-bit Intel 8088 at the heart of the PCjr is also the driving force inside the IBM Personal Computer. The PCjr's processor, running at 4.77 MHz, operates at the same speed as the IBM Personal Computer, though some of the PCjr's circuitry design slows down the machine's overall speed to a considerable degree.

Performance

What do these clock speeds and megahertz numbers mean in terms of real performance? It's difficult to gauge the bottom line speed of a computer, since there are a number of factors which affect its pace. Speed will also vary, sometimes greatly, from one software program to another. One way to get a feel for how fast each machine does what it needs to do is to give them similar tasks in the operation of some popular software programs.

How fast, for example, will the IIc and the PCjr load and calculate a spreadsheet on Microsoft's Multiplan? A 25 column by 25 row spreadsheet created with Multiplan in which each cell is equal to 1.001 times the cell to its left provides a fair test of speed. The IIc took 18 seconds to load and 22 seconds to recalculate the whole spreadsheet. The PCjr was somewhat quicker, needing 15 seconds to load the spreadsheet and 21 seconds to recalculate. A meaningful difference? Probably not, unless you're in a real hurry. The difference in speed is more noticeable, though possibly less critical, in a program like Flight Simulator where Sublogic's version for the IIc runs visibly slower than Microsoft's version for the PCjr. Broderbund's popular arcade game Lode Runner also runs visibly faster on the PCjr when the game is first loaded.

Is speed a major consideration in choosing between the IIc and the PCjr? The answer may be no for many applications. But you can be relatively certain that the PCjr will maintain an edge, even if it is just a minor one, over the IIc in terms of speed.

The PCjr and the IIc are equipped with 128k of RAM. With the introduction of IBM's new memory and power attachments, the PCjr can be expanded to 512k. Memory expansion kits for the PCjr are also

THE IBM PC/AT: JUNIOR'S NEW GODFATHER

Only two weeks after its package of PCjr "fixes" was unveiled, IBM's entry systems division in mid-August announced the long anticipated Personal Computer AT—alias PCII, aka "Popcorn" and any number of other designations of which IBM itself claims no official knowledge or recognition. In-house, the new machine is known as the 5170, Models 68 (base unit) and 99 (enhanced). It is based on the 80286 microprocessor, which is significantly faster than both the 8088, used in the IBM PC and XT, and the even faster 8086 employed in the AT&T Personal Computer. The standard model comes with a new high-density floppy disk drive affording 1.2Mbytes of storage space.

As is becoming the norm for IBM, the AT's debut was rife with "now/later" implications. Announced simultaneously with the $3995 (base price) personal computer was the IBM PC Network. But the PC-DOS version 3.1 that fully supports the networking system will not be ready until sometime early in 1985 (PC-DOS 3.0, announced as the current standard for the Personal Computer AT, can then be upgraded for $30). Likewise, the 80286 processor supplies enough speed for multiuser systems and, indeed, the AT is described as being able to support up to three users simultaneously—but, again, the Xenix operating system that makes this possible will not be available until next spring.

Graphics is yet another undropped shoe: While the 80286's capabilities would be sufficient for a bit-mapped, graphics-based windowing system (a la Apple's Macintosh), it's not there. Instead, the AT perpetuates the graphics card that was widely proclaimed to be outmoded when the IBM PC was introduced in 1981. The assumption: graphics help is still on the way.

So what does the AT do right now? In the view of Patricia Seybold, an authoritative office systems analyst who was one of a select group given an early IBM briefing on the machine, "It obsoletes the XT." Among the analysts, sentiments ran generally from indifferent to negative concerning even the short-term viability of the PC Network system versus larger-scale technology just over the horizon.

But considered by itself, in view of its sheer, maximum expandable numbers—3Mbytes of user memory and over 20Mbytes of storage space—the Personal Computer AT invites a certain amount of attention. IBM's price ladder is commensurate. Add $2000 to the base model (with 256k RAM and a single, 1.2Mbyte high density drive) to get 512k and a 20Mbyte fixed disk in addition to the high-density floppy. Putting together a complete AT system, then, will be relatively expensive. But it would satisfy the software requirements of today's power users and it would outperform the competition in that context.

With a new processor, a new version of PC-DOS and the new high-density disk medium, the full range of the AT's compatibility with existing hardware and software is still to be plumbed. (*Personal Computing* viewed the new computer virtually at our printing deadline, so a full analysis will be presented in our November issue.) There was no obvious indication that IBM is moving any closer to a restricted architecture in its new generation of Personal Computers, and to some people this itself was news. It will, however, cost you $400 for an optional (conventional) 360k diskette drive for your AT to be fully conversant with that apparently obsolescent medium.

The new IBM Personal Computer AT features quicker performance.

Photograph by George Mattei

According to the IBM's Personal Computer AT reference manual, the 80286 is "generally compatible with the Intel 8088" used in the Personal Computer; however, differences are noted that will affect overall compatibility. The user manual goes on to describe technical features that can render certain software programs virtually inoperable.

The new DOS 3.0 applications setup guide lists 30 programs, all distributed by IBM, that *cannot* be used with 3.0. In some cases, later versions of the programs will run. IBM does not, as a matter of characteristically rigid policy, comment on third party hardware or software. DOS 3.0 does contain a few interesting new utilities. The commands are: ATTRIB, to mark a given file as read-only; SHARE, to install file-sharing support; and DEVICE, which partitions unused memory into a number of "RAM disk" sections.

It is probably appropriate that a machine costing as much as a good used car should have an "ignition" key to turn it on. IBM has thoughtfully provided one, a feature more welcome for its psychological subtlety than its substance. As for the keyboard itself, the Shift key has finally arrived in a suitable size and shape. And the PrtSc (Print Screen contents) key you always accidentally hit at the same time you almost miss the PC's right Shift key—for an immediate freeze-up—has been put out of harm's way to the right of the numeric keypad.

Even if the AT is perceived as more than a souped-up XT, it is not a machine aimed at providing a Brave New World of personal computing. IBM has proven again that it's not in the Brave New World business. But hang in with us, the company implies, and things like power and price will gradually get better and better. While you wait. And if you doubt it, just ask any owner of an IBM PCjr.

—*Robin Nelson*

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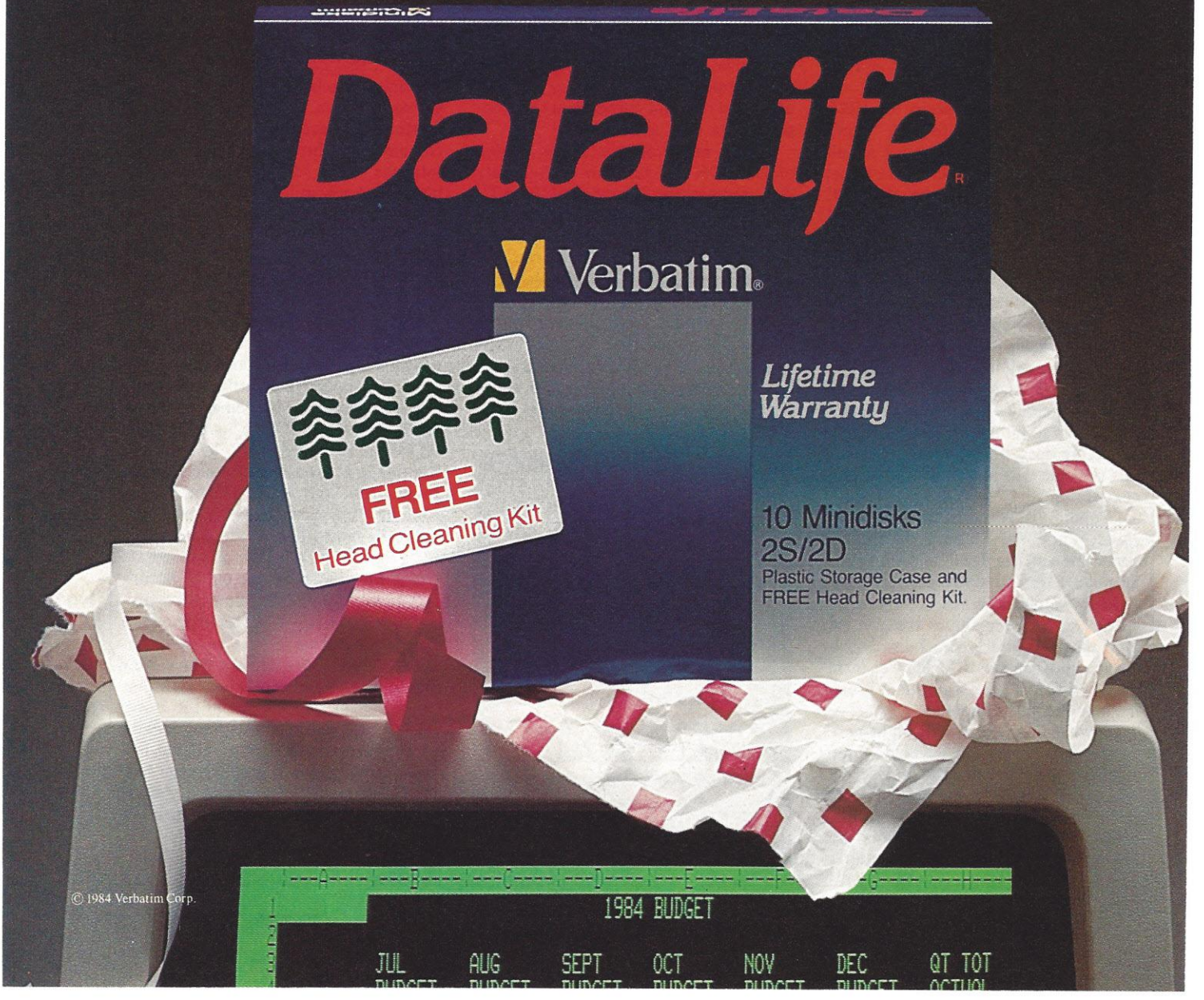
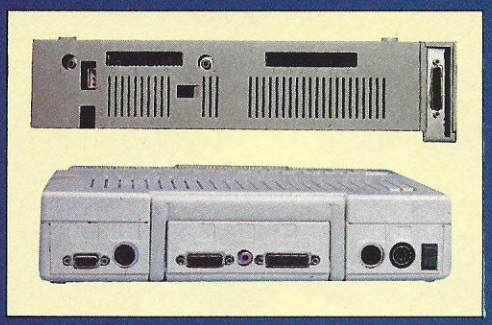


available from other manufacturers. (Microsoft, for example, has just introduced a product called PCjr Booster which adds 128k, a clock/calendar chip and a mouse for $495.) The IIc is limited to 128k since there are no provisions for memory add-ons in its sealed unit. To be fair, however, the IIc probably won't need extra memory since most programs written for it and the IIe can operate within 64k. The PCjr, on the other hand, is more apt to require the extra RAM to run the considerable number of application programs designed for an IBM Personal Computer with 256k or more of memory.



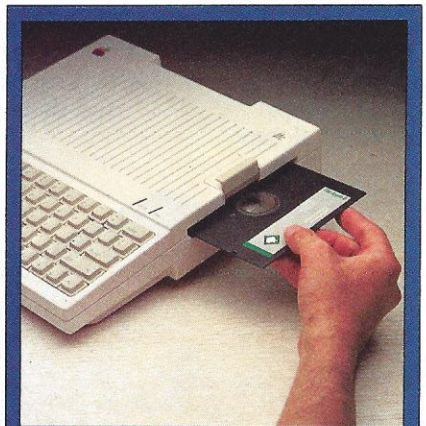
The rear of the IBM PCjr (top) sports 12 expansion ports. The IIc has room for seven plug-in devices of your choice.

The IIc's built-in disk drive can load 143k (or about 143,000 characters of information) onto a disk, with about 137k left for real storage after you've formatted the disk with ProDOS. The PCjr easily outdoes the IIc in disk capacity. The PCjr can load about 360k onto a floppy and can write to both sides of it with its double-sided drive. What this mean in terms of documents will depend on the software you're using, but the difference can be great. If you're using PFS:Write as your word processor, for instance, it means you'll be able to store 112 one-page documents on a disk using the PCjr but only 25 of the same size documents onto a IIc disk—partially due to the PFS program itself. That difference will end up costing you dollars because you'll need more floppies with the IIc.

The IIc, however, also offers an optional second disk drive ($329)—an option missing from the PCjr. A few of the manufacturers offering memory expansion for the PCjr have also included a second drive in their kits, but there is no such option available from IBM. Instead, IBM has chosen to forestall the problem with the RAM disk program included with additional memory purchases. But a RAM disk, it should be noted, cannot be used for permanent storage since the information in the RAM disk—like everything else in RAM—is erased when the computer is turned off by the user.

Peripherals and expansion

Both the IIc and the PCjr have expansion ports for adding more peripherals. The IIc has two serial ports which can support Apple's own 300-baud and 1200-baud modems ($225 and $495) and the company's Scribe thermal ($299) and Imagewriter dot-matrix ($595) printers. Apple's Color Plotter ($779) will also run off one of the serial ports. Other modems, printer and plotters—provided they are serial (not parallel) devices and have the proper connecting cables—will also work with the IIc. A second power supply for the IIc ($39), identical to the one included in the initial purchase, is available and may be well worth considering if you frequently move the IIc from one place to another and don't want to carry the heavy transformer with you.



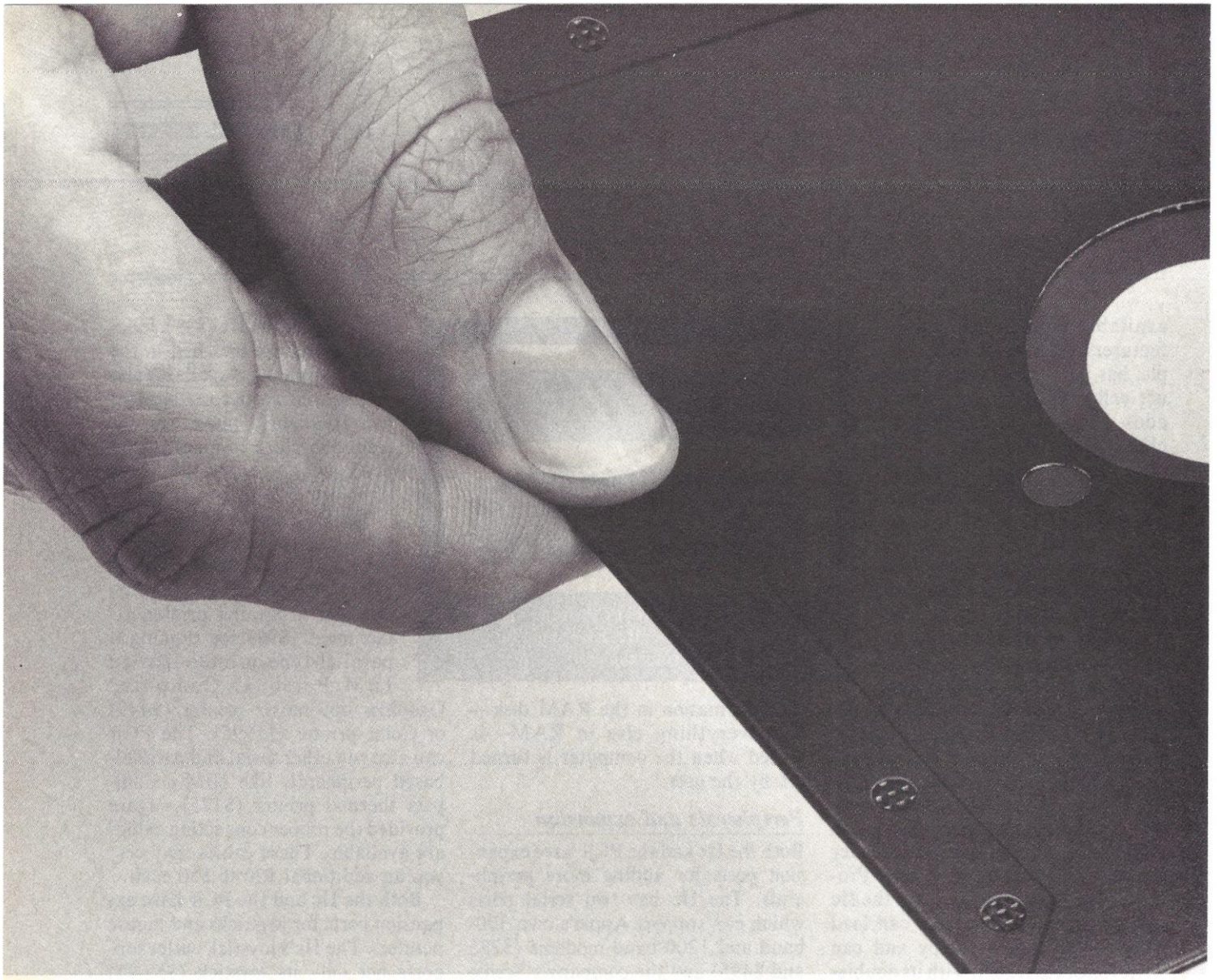
The IIc can run most of the Apple II family's library of software.

The PCjr comes with only one serial port but has an optional internal 300-baud modem ($199) that you can install yourself and a parallel printer attachment ($99) for running a parallel-type printer like an IBM Personal Computer Graphics dot-matrix printer ($449) or Color printer ($1995). The PCjr can also run other serial and parallel-based peripherals like IBM's Compact thermal printer ($175)—again provided the proper connecting cables are available. These cables may cost you an additional $20 to $50 each.

Both the IIc and the PCjr have expansion ports for joysticks and mouse pointers. The IIc's joystick outlet supports not only its joystick ($59.95) and game paddle ($34.95) options, but the company's AppleMouse pointing device ($99). The PCjr provides two joystick ports and can also support a mouse through its serial port—though that requires a mouse kit like the one from Microsoft and a serial adapter ($25). The PCjr has additional expansion ports for a cassette recorder hook-up, a light pen and an external speaker.

Carrying cases are available for both machines: $39 for the IIc and $60 for the PCjr.

While a close look at the IIc and the PCjr may provide you with some of the answers you need, it may also prompt some of the questions you need to ask. But that's an important part of the buying process. Which one's right for you? The answer will depend only partially on the capabilities of the IIc or the PCjr. The rest will be derived from your own determination of what it is you need and want from a personal computer.



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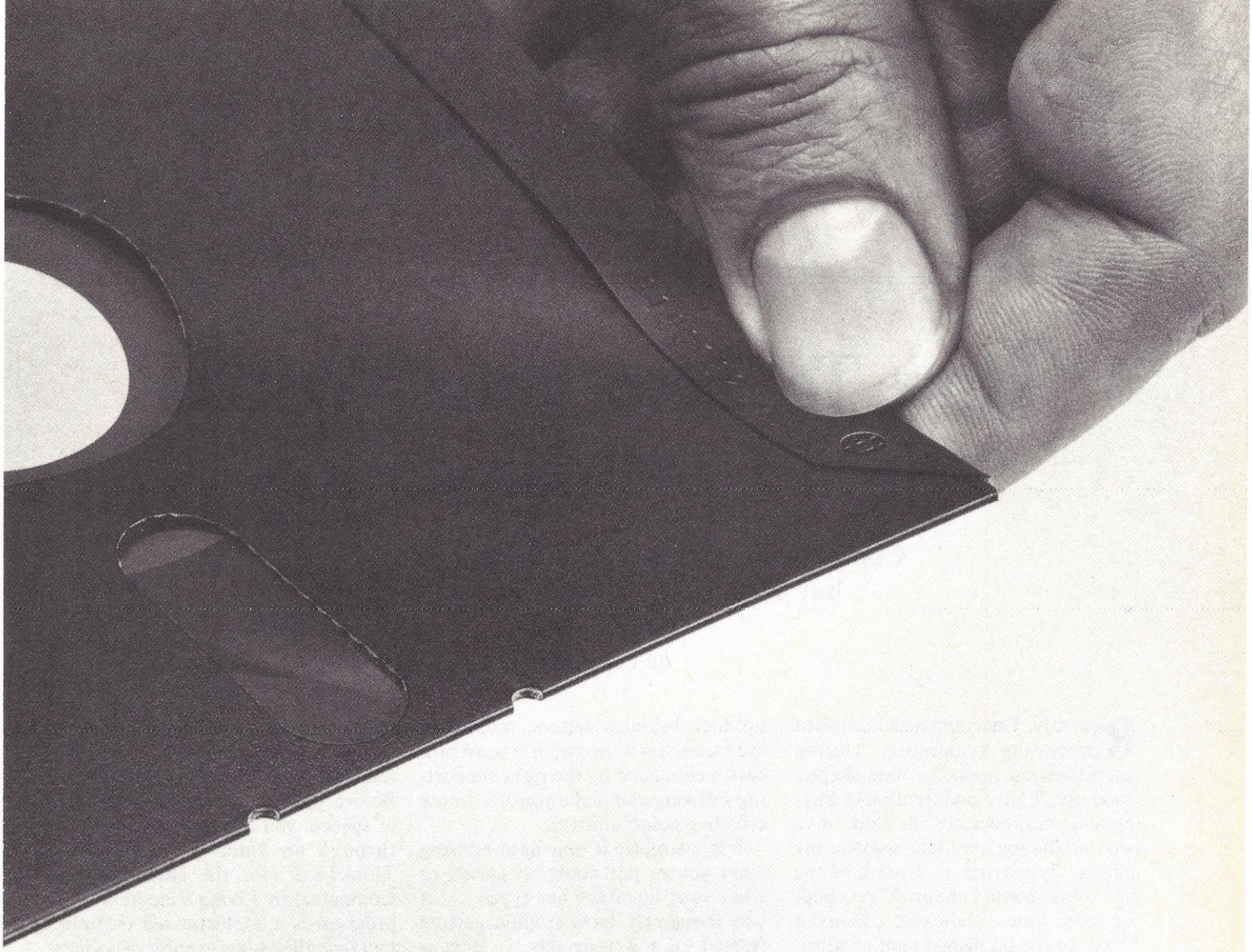

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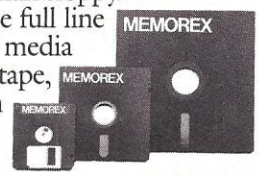

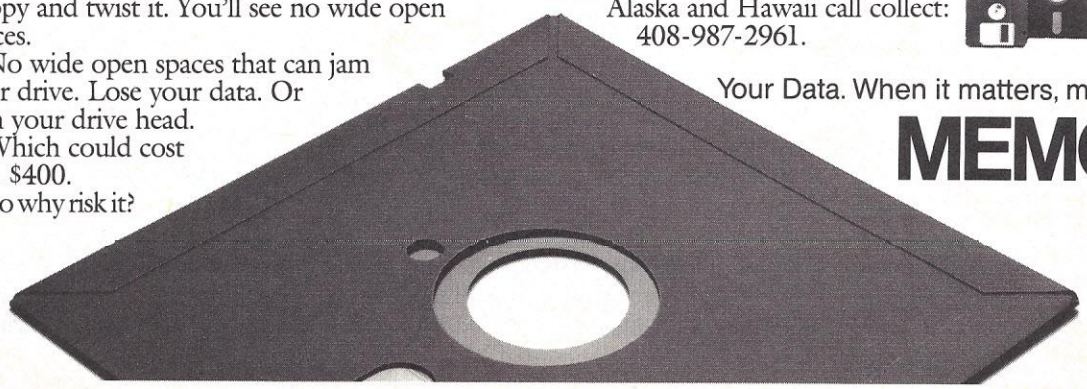

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How To Turn Your Writing Into Communication

Computer-prompted prose doesn't always sing, but it gets to the heart of the matter

by Peter Bates

Recently, I participated in a word processing symposium. During the discussion period, a lone skeptic stood up. "I have no intention of buying a word processor," he said. "I've been producing excellent copy on my memory typewriter at a tenth of the cost. Why should I change?" At about the same time, syndicated columnist Mike Royko published similar sentiments: "I use one (a word processor) at my job and it's just a high-class typewriter. It doesn't help you write better—it helps you type better. If you have nothing to say, you'll just sit there silently staring at the screen with your little blip silently blipping at you."

These feelings seem to be fairly commonly expressed today. It's as if some people fear that the new technology is going to erase creativity, or somehow be confused with it. Individuals who have had little experience with actual production of print communication—managers who dictate everything, for example—often have no grasp of how electronic word processing can change the tone, style and even the content of what they have to say. The easily demonstrable facts, however, are as follows: If you *don't* write for a living, but regularly produce business letters, memos or even speeches on occasion, a word processor enhanced by the right supporting software can make you a far more effective communicator.

For example, if you hate revising what you've put down on paper, or what your secretary has typed . . . if you frequently have trouble getting started on a writing job . . . if your writing lacks zip—perhaps you overuse the "passive voice" without realizing it—then, a word processor with added writing improvement software can definitely help you. These programs range from those which provide a format for prethinking a piece of written communication to those which go over your draft with an electronic fine-tooth comb, sifting out common grammatical and stylistic faults that tend to impede the expedient transfer of clear thought. And, as we'll note later on, even more powerful programs are in the offing.

But Royko is right about one thing: If you have nothing to say, you'll continue to just sit there.

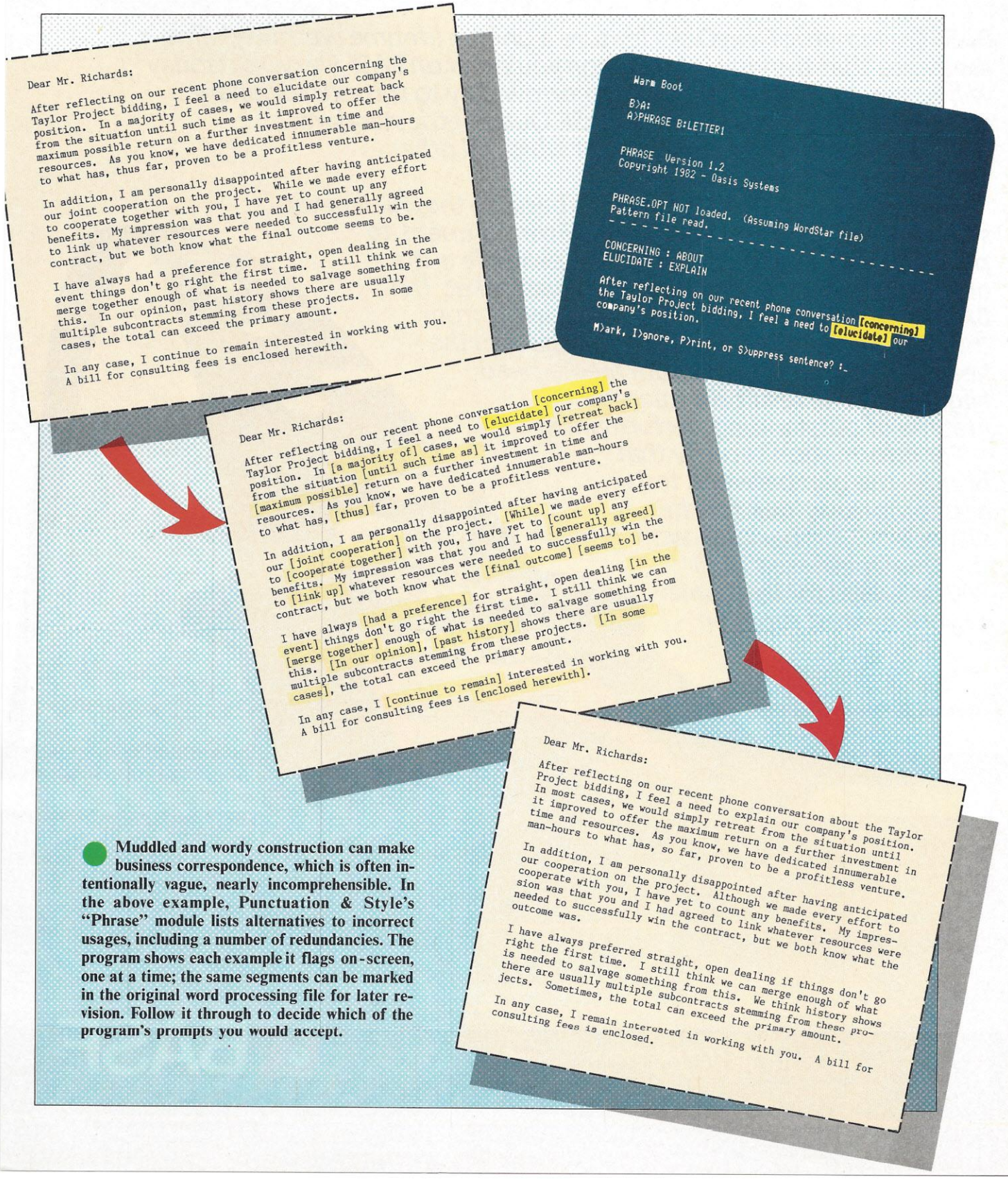
Does this happen often? Not very. Many people—professional writers included—know essentially what they want to say, but will do anything to avoid getting down to saying it. They make a pot of coffee. Take walks. Talk on the phone, play with the cat. Then the wastebasket gets filled with half-hearted intros. They need a psychological boost, a tool to help them organize their thoughts.

There are programs available today that can attack "writer's block." Before you write your report, article or speech, you can run your thoughts through an "idea processor" like ThinkTank (for the IBM Personal Computer) by Living Videotext. This program is a sophisticated outlining tool that allows you to enter new ideas, then expand upon them later. Because computers can rapidly juggle information, you can enter your key points as they occur to you—then organize, label, alphabetize or subdivide them later with a few keystrokes.

Unlike standard outlines, which organize by letters and numbers, ThinkTank marks categories with plusses and minuses. By using the plus ("Expand") you can hide more information underneath; the minus ("Collapse") indicates there are no more levels. Why would you want to do that? With the Expand command, you can view your concealed "+" categories. With Collapse, you can see your piece in stripped outline form and determine how the main parts relate to the whole. When you Expand, you can determine if your paragraph on "marketing" really belongs under "growth projections." If not, move it elsewhere.

Other outline processors include Select Information System's Freestyle, Ashton-Tate's Framework, and Idea Ware's Idea Processor, which

Peter Bates is a Boston-based freelance writer and a marketing writer with BGS Systems in Waltham, Massachusetts.



Muddled and wordy construction can make business correspondence, which is often intentionally vague, nearly incomprehensible. In the above example, Punctuation & Style's "Phrase" module lists alternatives to incorrect usages, including a number of redundancies. The program shows each example it flags on-screen, one at a time; the same segments can be marked in the original word processing file for later revision. Follow it through to decide which of the program's prompts you would accept.

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Word processors have been called "ideal editing tools" because they can rapidly delete words and paragraphs, change text blocks around like Silly Putty, instantly correct a misspelled name throughout a 50-page report, and other technological miracles. "Those features are nice," a skeptic might say, "but I edit *after* I write something. Can it help me with my first draft?"

Yes. Once you begin writing, you'll notice most word processors automatically "wrap" words as you type. You no longer have to use the carriage return. This is more important than it seems. According to Fluegelman and Hewes' excellent book, *Writing in the Computer Age*, many people practice "sprint writing," unravelling their prose in a rapid word string that's often ungrammatical and filled with errors. Unimpeded by the carriage return and later aided by the program's editing facility, they can produce rough copy at a pace that keeps up with their thoughts. "Writing generates ideas," say the authors. "Simply put down whatever comes into your mind."

The final copy may not look anything like the draft. You may choose to move your introduction five paragraphs down, rewrite your conclusion and make it your beginning.

"I fear typewriting," says Nancy Levy, manager of Simplified Technology, a Boston firm, "because it makes my writing feel so permanent. With my word processing program I find I write more and longer because I'm not as inhibited about what I type."

When electric typewriters came out, writers rejoiced because these machines sped up the job of writing, made it more efficient and pleasurable. Today few joys compare with gliding through a writing job on a word processing personal computer as fast as your fingers can fly. Word processing not only speeds up your writing, it eliminates drudgery. The other time-saving tools are also available: programmable keys and split screens.

The IBM Personal Computer and its clones have sets of function keys that, depending on the software, stand for certain word processing commands. One key may take you to the beginning of the document; another may normally scroll up or down. However, they are configurable (programmable), which means you can alter what they stand for. If, for instance, you happen to be writing a play with lead characters like "Mr. Frobisher" and "Mrs. Higgenbo-

CUSTOMIZING YOUR WRITING AIDS

Generalized word processing enhancements are fine; but they can give you even more help if you take the time to tailor them to your specific writing patterns and requirements. You may need some assistance in this; we're not really equipped, by definition, to readily identify our blind spots. Words—technical or obscure—you use only frequently enough to consistently misspell, phraseology you have always inappropriately applied, those grammatical stumbling blocks you've had since grade school . . . all these belong in your customized checking system. How to identify them? Someone you frequently correspond with, or through, can be of considerable help.

Then, make sure the writing aids you are going to use are capable of being customized.

Grammatik and Punctuation & Style, for example, are not only interactive programs; they are also flexible. You can easily configure them to your own specifications. If you examine any of the widely accepted style manuals, like Strunk and White's *The Elements of Style*, or Ross-Larson's *Edit Yourself*, you'll find still more lists of redundancies and cliches. Then, through your word processor, you can enter P&S's "Patterns.Txt" file or Grammatik's "Phrases.Gmk," and add as many clunkers as you want. For example, in less than an hour I added a dozen phrases-to-avoid like "prioritize," "self-expression," "for all concerned" and "personalize."

Neither of these programs is actually designed to advise you on correct usage—like choosing "lay" or "lie"—but you can sidestep this limitation: Simply enter the word you're unsure of, followed by its appropriate application. For instance, since I regularly confuse "stationary" and "stationery," I typed in each word, followed by its definition. Whenever the style checker finds either word in my text, it flags it, not knowing whether it's right or not, but deferring to my judgment.

When I first realized that the programs could train me not to use certain words, I cracked the whip even closer. I programmed them to flag "interesting, archetypal, dynamic, crux" and "beautiful." I stopped at "feature" and "fantastic," realizing I was turning into a computer compulsive.

You can also create your own mini-thesaurus. This isn't as hard as it sounds. List some bureaucratic words like "acquire" and "supplement" or nominalizations (verbs transformed into nouns by adding "ion" like "discussion" or "regression"). Then find simpler alternatives in a synonym dictionary. The *Thorndike Barnhart Dictionary* is one that always suggests simpler alternatives. You'll find a typical list can comfortably fit onto your style/editing disk, probably using less than 20k. Although you cannot activate this new file while you write (like an in-context thesaurus), you can call it up after a writing session and buff your prose until it shines ever so brightly.

You should also ask yourself, "Do I really want an electronic thesaurus?" Ann Bernays, author of *The Address Book*, still prefers to turn away from the screen to find *le mot juste* in Roget's. "It gives my eyes a rest from the glare," she says. You decide which is appropriate for you.

—*P.B.*

tham," you can program the F1 key to stand for Mr. Frobisher. You can also specify tab stops, so that every time you type F1, Mr. Frobisher appears in the center of the page. A playwright's dream.

Don't despair if your portable 8-bit computer has no configurable keys. A "macro" program like Smartkey II can redefine your keyboard without confusing your computer. You can designate a seldom-used key (like the Control key) as Mr. Frobisher. Simply type in Control-F and he appears. Two strokes instead of 15. Or 1500.

Nathaniel Weiner, a Norwood, Mass., lawyer, uses Smartkey II in his practice. He finds it makes life simpler. "I often have to mention 12 or more defendants several times in a legal document. It's hard to imagine not using keyboard definition; I've grown to depend on it."

Linda Falstein, director of math skills at the University of Massachusetts, uses Microsoft's Word to write her textbooks. This program has a glossary that can hold entire paragraphs in memory, even after the computer's shut off. "After each chapter, I need to instruct students to check their answers on a certain page. I've named that instruction sentence 'CK'. Each time I type 'CK' and a programmable key, the sentence appears. Incredible!"

Using on-screen notes

How does split-screening improve your writing? It makes text more accessible: You can copy direct quotations, say, from a transcription file without using paper and put them into your text. If your note file is 30 pages long, you can find a specific reference with your word processor's "search" command in seconds. You can also send five personal letters to colleagues, including in each a separate product description file from the other window.

Falstein says: "Until you use it, you have no idea how useful it is. You can split the same article in half and see if a paragraph looks better on page eight or page three."

Currently, something less than a third of the most popular word processing programs offer split-screening. Some examples are: Word, Perfect Writer, Power Text, Select, and AppleWriter II. Perfect's windows can change size and scroll independently. Microsoft's Word has eight windows, which will split either horizontally or vertically. (This is more power than most occasional writers need, so you don't necessarily have to choose a program based solely on its windowing capability.)

Some programs are capable of questioning writing "style" as well as flagging common punctuation errors.

Keeping track of how much you write is important. Your directors may want a 10-page report first thing in the morning. Instead of counting your words by hand, make sure your program has a word count feature. (This is also important when writing for a publisher who is paying by the word.)

Spelling-checker programs are useful, but many have annoying limitations. They come in two varieties: in-context and post-editing. The in-context kind can check the spelling of a word right after you type it; with post-editing you have to run the checker separately through your finished piece. Both will question words they fail to recognize, sometimes offering remote alternatives, as if to say, "Could you have meant this?" Their dictionaries vary from 20,000 words to over 100,000. Some checkers will not recognize plurals and report them as "mismatches." Others concentrate only on the root of a word and get confused by a simple suffix. They may let "conditional" pass and question "conditionally." You can update them to include these words, but it's a never-ending task. Some limit you on how many new words you can add; others let you use all available disk space. Most spelling checkers do not distinguish homonyms, like "to" and "too," so don't depend on them to proofread all your typos. They're just not smart enough yet.

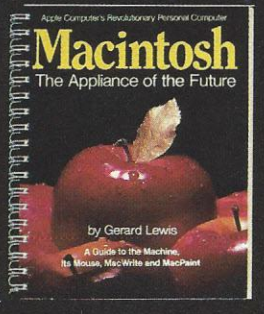
A few programs go even farther and are capable of questioning writing "style" as well as flagging common punctuation errors. Punctuation & Style is a software package developed by Wayne Holder of Oasis Systems that already has a reputation as a strict taskmaster. Its initial module, called "Cleanup," is straightforward. It catches you at things like typing only one space after a period (except with abbreviations), or if you haven't closed a parenthesis, or even—in the white heat of writing—if you type "the the," a surprisingly common mistake. Despite these attributes, it has its limitations. P&S can not advise you whether to use a colon or dash, or even when a question mark is appropriate. When the decision is purely mechanical, it helps. On matters involving any degree of human judgment, you're on your own.

Computer-aided writing style

Phrase, another P&S module, is a different beast entirely. Holder and his team tailored its selectivity on such academically endorsed style books as Strunk & White's *A Manual of Style*. It goes after and traps a wide range of muddy, verbose, erroneous, folksy, redundant or pompous phrases. Sometimes, Phrase will suggest an alternative; often it simply advises you to avoid the expression. (Interesting examples of the latter: "tends to" and "relatively".)

How does it work? According to Holder, Phrase uses a "fast search algorithm," a highly structured pro-

Focus



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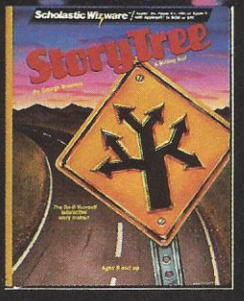

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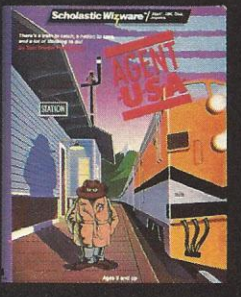

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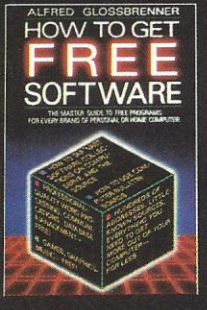

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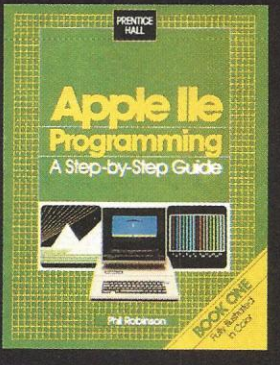

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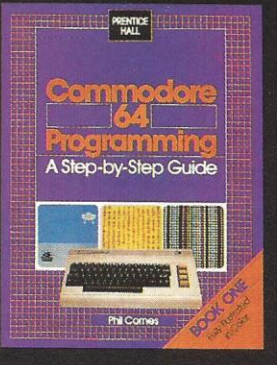

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cedure that recognizes over 700 delinquent—according to Strunk, White, et al—phrases, then retrieves the appropriate suggestion. The important point is this: You can choose to mark up your text or totally ignore Phrase's brassy remarks.

Cleanup is actually a more complicated process, because punctuation "rules" have so many exceptions. For instance, it will nail a capital letter it finds in the middle of a word, like "naSty." So what does it do about "McGillicuddy"? Holder has designed a sub file that Cleanup refers to during its final search. Users can stock this and other files with their own personal exceptions if they wish (see page 63).

One of the more merciless files used by Phrase is one called "Passive.Txt". This gem is derived from the ideas of people like Richard Lanham, author of *Revising Prose*, who believes most writing would be clearer and less awkward if writers limited their use of the passive voice. Lanham goes so far as to suggest that you flag every occurrence of the verb "to be" and every preposition. Holder trained Passive.Txt to do the same thing. "In a sense," he says, "it is an unfair program. It's difficult to tell when the passive voice is appropriate or not." Although it's very easy to overuse it, or take its "suggestions" too literally, Holder maintains that many people who want to become better writers can learn from it.

Wang Laboratories' Grammatik is another program designed to go through your word processor's disk files and spot sloppy phrases (but not the passive voice). You can expand it, like Punctuation & Style, to flag more than the 500 stylistic gaffes it's designed to catch. Despite its name, however, Grammatik cannot spot such grammatical errors as subject/verb disagreement, or questionable usage—like whether to enlist "it's" or "its." It will do other useful tasks, however. You can activate its Sexist file as a dictionary which tags about 100 gender-specific terms.

Consultant Alan Chapman of Framingham. Mass., finds this feature to be very useful in his work. "I first used it while writing a company policy manual," says Chapman. "I had to avoid all those he's and she's. It really caught me a few times. Now, I'm tuned into the pitfalls and don't have to rely on it as much."

Grammatik's Profile file will announce how many times you've used each word, starting with the most frequent (usually "a" or "the") and moving down the list. Why would you want to know that? Grammarians considered it poor style to use a word too frequently, especially ones that stick out, like "ambidextrous." Holder's The Word Plus package also has a word frequency as well as a word counting feature. Some writers use this type of program as a poor man's spelling checker.

You still choose what to write. Software can only advise you to trim the fat from your prose.

What can you do if you find that a word occurs too frequently? Or if it's not exactly what you want? There's electronic aid for that problem, too. Buy a word processor with an in-context thesaurus. Perfect Software's new 2.0 series has one. So does Peachtree Software (PeachText 5000).

Perfect Software's program is so new it hasn't been extensively evaluated yet. (The IBM version has been available since June; the Apple and CP/M will be available in November.) Judging from the documentation, it seems easy to use. It requires double-sided drives. After saving your document, you then replace it in Drive B with the thesaurus diskette. Place the cursor on the word, select the thesaurus option on the search menu and synonyms appear. For example, choices available for the word "defect" are "failing, fault, flaw, imperfection, deficient (deficiency?), shortcoming, foible, weakness, drawback, lack, infirmity, blemish." Next, move the cursor to your choice, call up the submenu and pick "replace." The thesaurus inserts the replacement word into your text. When you replace its disk with your document disk, you're finished. Less disk-swapping would be preferable—it would be more convenient if the thesaurus were on Drive A with the word processor. Another shortcoming: You cannot enter the thesaurus to add or delete words.

"A thesaurus functions better with a 10Mbyte hard disk," says Michael Benn, president of Facilities Data, Inc., of Cambridge, Massachusetts. Ordinarily, PeachText 5000's thesaurus works the same way as Perfect's does. Sidestepping the disk swapping, Benn loaded both the word processor and thesaurus onto his Compaq's hard disk and now accesses it with two keystrokes. "It's definitely better than flipping through a book" he says. "However, if you're searching for subtleties, you may need that book."

More power on the way

What will personal computer writing aids be able to do in the near future? In relative terms, astounding feats. Two mainframe-origin programs are now being tested at universities: AT&T's Unix-based Writer's Workbench and IBM's Epistle. Both need extensive memory, but that may soon change.

Writer's Workbench, the most publicized of the two, can determine the "readability" of a text, based on three different formulas. One of them, devised by Rudolf Flesch in *The Art of Readable Writing*, scores print communication higher for shorter words and sentences, number of quotations, and questions directly addressed to

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the reader (like, "Can you imagine what this means?") Writer's Workbench's statistics-gathering programs tell you what percentage of your sentences are complex or simple and how long your average sentence is; and it compares your words with its own list of 4000 "familiar words." By calculating the percentage of words not on its list, it can—with its other components—determine the approximate educational level an average reader would need to wade through and comprehend your written document.

Mainframe users can customize Writer's Workbench. Not only can they add their own awkward phrases and customized dictionaries, they can also insert "ideal" documents the program can compare with their own articles. If, for example, a group of writers were working on an annual report they could key in 10 other annual reports they admired, then compare their version to the models for readability and human interest.

Org, a Writer's Workbench organizational subprogram, can format a text and preserve headings, while printing only the first and last sentence of each paragraph. Since only some writers doggedly follow the traditional paragraph format (first topic sentence and final concluding one), this feature may not have wide use.

How has Writer's Workbench fared in tests? Reasonably well. The English department at Colorado State University ran the program extensively, using experimental and control groups over a 10-week period. Part I of the final test, which dealt with right/wrong errors in mechanics (punctuation, agreement, spelling), showed no difference between the two groups. The real change surfaced in Part II: Editing and Revision. The students who had used Writer's Workbench fared much better than the control group. And in a separate attitude test, most students in the experimental group agreed that using the computer was enjoyable, easy and not frustrating.

Epistle needs about 1 Mbyte of virtual memory; currently it can only run on IBM mainframes of the 370 family. If the user has a color monitor, errors show up in red. Like Writer's Workbench, it checks style, telling users if sentences are too long or if they have too many prepositional phrases. It will soon flag sentences beginning with an infinitive or sentences ending with a preposition. Unlike Writer's Workbench, Epistle can check grammar. By activating its 130,000-word dictionary and 400 grammar rules, it finds incomplete sentences, verb-subject disagreement, noun-modifier disagreement (for example "those apple"), wrong pronouns ("us came") and non-standard verb forms (like "was did" instead of "was done"). Epistle can tag more than 90 percent of the known grammatical errors. Lance Miller, the program's designer, says that he wouldn't be surprised if it were available on IBM Personal Computers or XT's within two years.

No matter how impressive these writing aids are, they have drawbacks. Educators have noted that when computers make value judgments on style, they can inhibit students, make them write in an "official style." Ironically Rudolf Flesch, the inventor of one readability formula these programs use, warns against rigidity in grammar. Should sentences be ended with a preposition? Flesch quotes Winston Churchill: "That is the type of arrant pedantry up with which I will not put." Flesch continues: "There's hardly a rule in English usage that holds good in all possible situations; in fact, whenever there is a choice, the mechanical application of a rule-of-thumb will be more often bad than good."

Computers cannot evaluate content. It's possible to produce a perfectly balanced, grammatical, readable article that makes no sense. How can a style program determine whether "I like my second cousin better than quince jelly" is absurd? It can't because there are too many parameters for it to handle. If you think there's a danger that they will take all your decisions from you, don't worry. You still choose what to write. Software can only advise you to trim the fat from your prose and sound the alarm when you're getting too stuffy, or too verbose.

Some people are not as concerned about choosing their own words as others are; if you're one of them, you should know there are examples of "official style" writing that can be purchased fully composed. People may scoff, but if it gets your message across, a "boilerplate" letter is as good as any other. Better Letter & Writer by Softron, Inc. (IBM Personal Computer, Commodore 64, Apple, Atari) supplies 100 prewritten letters, resumes and other standard business forms. Just type in your own variables and you've "composed" a letter without writing it.

There is no reason to fear writing. The terror of revision is gone; software programs exist to help you at every stage of the writing process. Some even teach you how to write. Bessler Educational Software puts out a seven-part grammar series for the Apple computer. Two of its programs are "Future and Conditional Verb Commands" and "Familiar and Formal Commands." Educational Activities, Inc. sells a "Writing Competency Program" (Apple, TRS-80 Model III) that teaches letter writing, report generation and persuasion.

Enhanced word processing may be the best thing yet for improving your written communications. It will help you scrub and revamp your prose. It has only one obvious drawback: If you're the compulsive type, you'll be tempted to revise too much. In time, you may well outgrow some of your writing aids—or at least, like Alan Chapman, use them less the more you write. When you do, it will mean you have programmed yourself to get your ideas across in the clearest, most expedient way possible.

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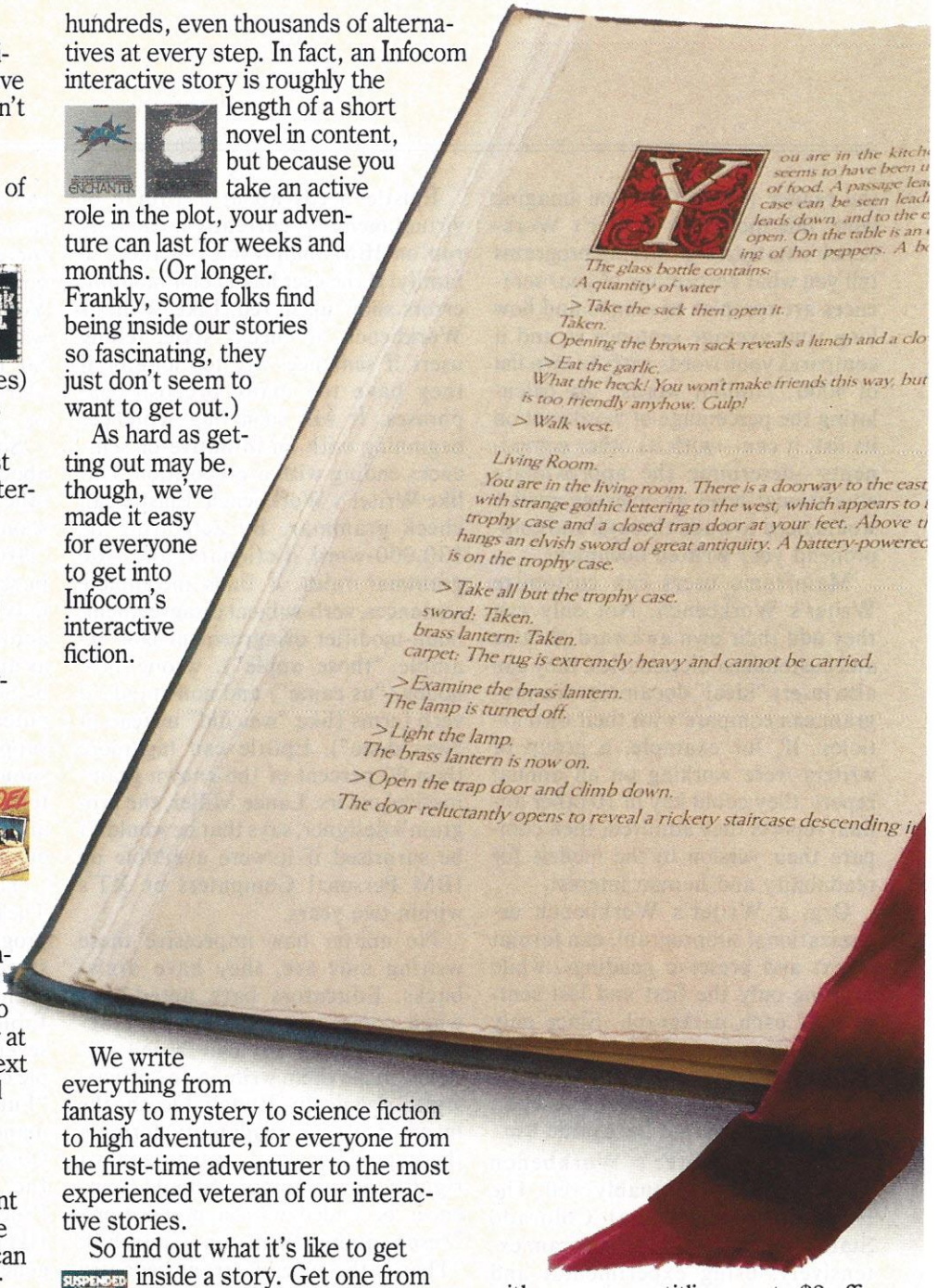

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CIRCLE 50

Working With Statistical Analysis

Once used only by scientists, statistical analysis is now available to the corporate world through personal computer software packages

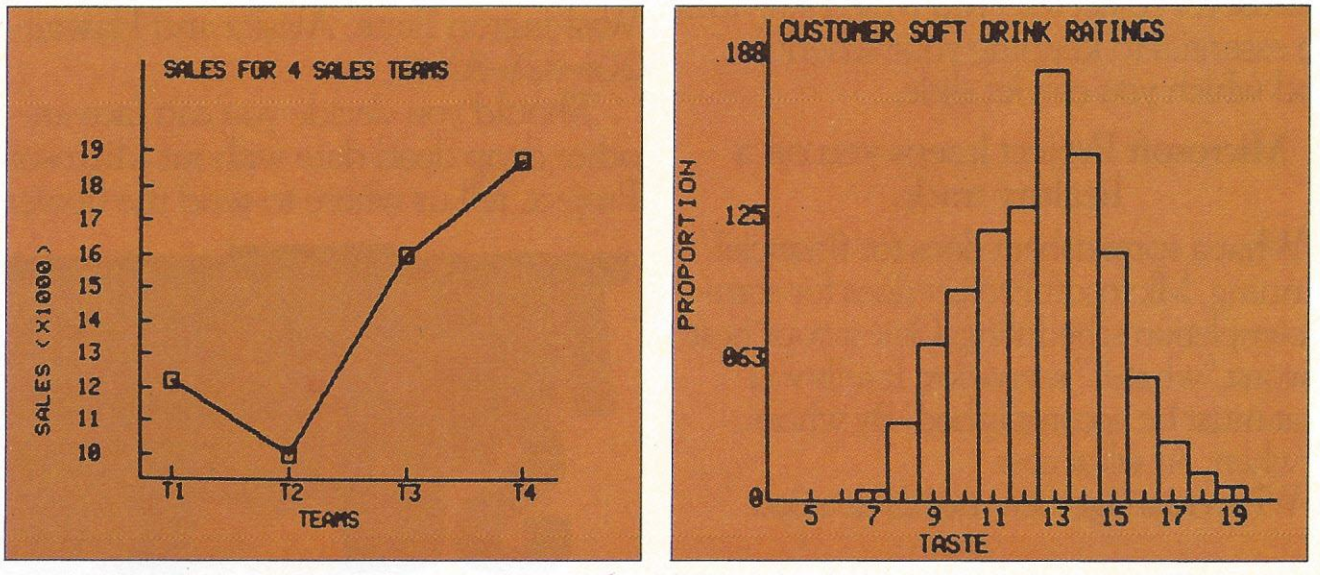
by Lisa B. Stahr, Associate Editor

Statistics is the science of collecting, analyzing and interpreting data. To do a *statistical analysis*, for practical purposes, generally means pinpointing a problem, forming a hypothesis that is relevant to that problem, collecting information, analyzing it and then interpreting the results either to prove or disprove the original hypothesis. If you aren't now using this tool in your business, or are unaware of what it can do for you, you may already be many steps behind your competition.

Statistical analysis is applied in many corporate areas. In management, for example, statistics can be used in long-range planning; in personnel, it might be used to determine why certain groups of people receive poor performance evaluations, to pinpoint problems and perhaps to make related policy changes; in research and development, statistics can help estimate costs or time, manpower and equipment needs; in finance, statistical analyses can estimate the profit potential of present or future investments; in production, it can be used for quality control and materials handling; a sales department might utilize it to determine projected sales.

Yet, says Dr. Virginia Lawrence, president of Human Systems Dynamics, makers of six statistics programs for personal computers, "Until now in business, if you wanted to use statistics you had to use a calculator." Even larger corporations with mainframe computers didn't have readily accessible statistics packages. In fact, unless they had a large scientific component within the company, they probably didn't have any statistics [program] at all."

But even business majors and MBAs who have studied statistics would likely find that trying to carry



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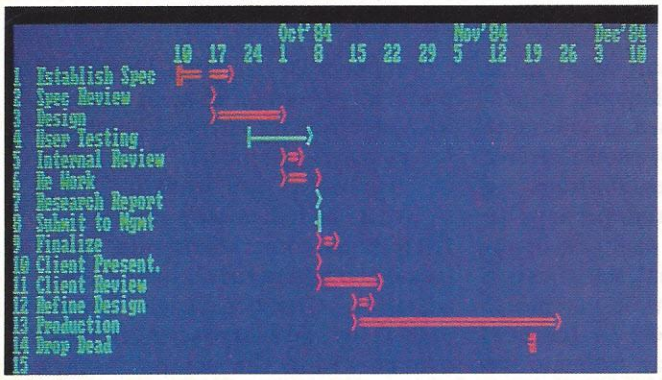

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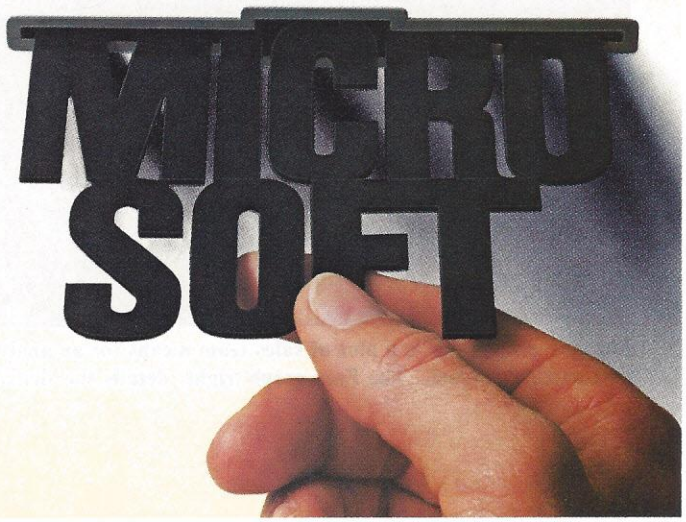
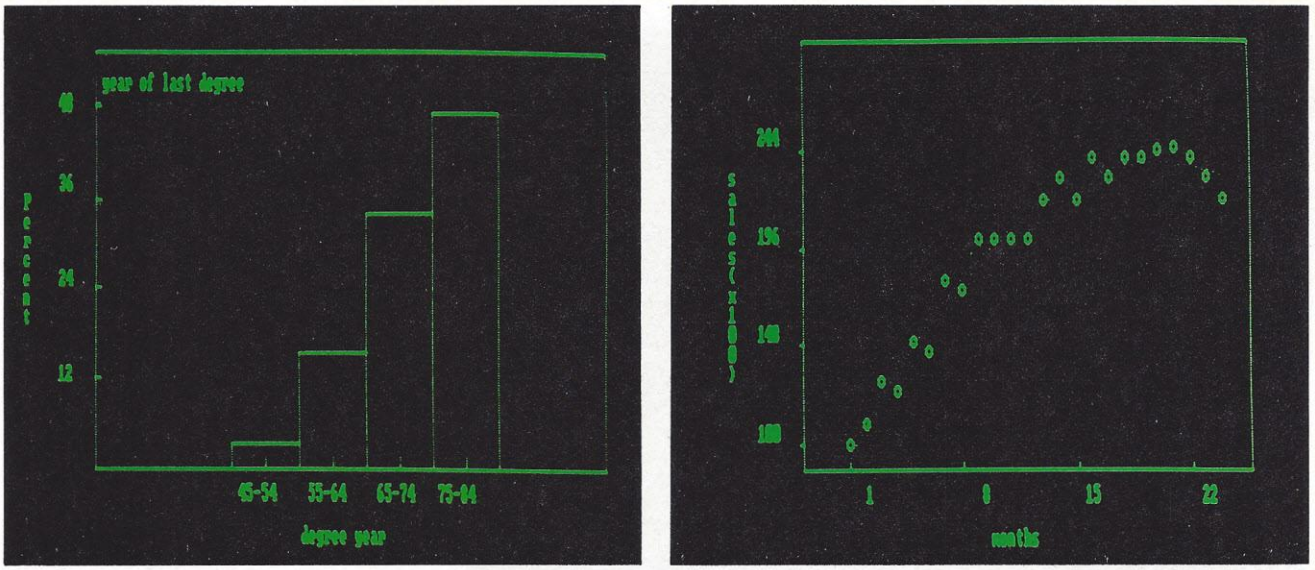


Packages on the market assume that the user is familiar with the basic concepts of statistics.



A frequency distribution bar graph of customer survey data (left), shows the percentage of people in each year of last degree category. A curvilinear or polynominal regression is at right. The dots are monthly sales, while the curve is the regression curve.

out a statistical analysis with only a calculator will be far too time-consuming to be practical, Lawrence points out.

But when the personal computer arrived in the business world, computer-generated statistics became more readily available. Workers began using spreadsheet packages like VisiCalc and VisiTrend to do statistical analysis. The results were encouraging, but not completely satisfying, since spreadsheets could handle only the simplest of analyses.

Power to spare

Today there are more powerful software packages that do almost all types of statistical computations to help you deal with data and make decisions more quickly than ever before. All you need is a personal computer, a package that will help you through the collection and analysis aspects of the procedure, and a basic knowledge of statistics so that you can interpret the results the package will produce.

Every statistical package on the market today assumes that the user is familiar with the basic concepts of statistics. The program may provide assistance for filling in data and may even aid you in choosing which analysis to perform, but it won't help you interpret the results of the tests you run. Those decisions are up to you.

According to Dr. Robert Hisrich, a professor of marketing at the Boston College Graduate School of Management who teaches statistics as part of his courses on marketing research, having a background in statistics is a prerequisite to doing any type of statistical analyses—with or without the help of a computer. "You need to have a fundamental understanding of applied statistics to understand what the data means," Dr. Hisrich warns. "People who don't really understand what the data means can make some erroneous conclusions about the results they get." The key to using statistics effectively, says Hisrich, is to understand what test to choose and why you're choosing that particular test.

Many professionals already have learned enough about statistics to begin incorporating it into their work. But even if you know just the basics, such as the difference between mean and median, for example, you still might benefit from more instruction. "If you want to get the most out of what the package is telling you," advises Dean Neubauer, senior statistical engineer for the manufacturing and engineering division at Corning Glass, "you should have at least two or three [statistics] courses under your belt." Just one course gives you a false sense of security, he adds. "Too many times I've seen people get one seminar or college course in statistics and then they're self-proclaimed experts in the field. They proceed to look at printouts of statistical analyses and the means and the standard deviations, and think that's all there is to look at." According to Neubauer, the value of a statistician is that he can read between the lines.

Anatomy of a statistics package

So what do you do if you have a basic knowledge of statistics, but you aren't about ready to hire a full-time statistician to "read between the lines"? The next best thing is to do it yourself—with the help of a statistics program and your personal computer. These two tools can be instrumental in organizing your data, analyzing it within minutes or seconds, even refreshing your memory on what statistical analyses are available and what

An SPSS-PC frequency table and histogram from a 1983 survey on the taste of various beers (top). A chart of marriage and divorce rates (bottom) between 1900 and 1981.

they'll do for you. The market isn't saturated wih statistics software right now, so you'll find there aren't big differences in the packages available.

What you will find, though, is that most packages have three basic features: a data base module for storing your data, a statistics module for performing the analyses (this is where the real meat of the program is) and a graphics module for turning the numbers into pictures. Generally, these three sections work both individually and collectively for a complete statistical process.

The data base within a statistics package is the area where you store your collected data. To better understand how you store the data, let's look at an example. Say you just finished a survey on whether people like their hard candy sweet or sour. The data you took from your respondents includes information about their age, annual income and sex, along with whether they preferred a sweet or sour taste. Each person you queried is referred to as a case (or a record, in computerese.)

Making sense

The next step is to classify this data, which is what a data base helps you do. Now that you've finished your survey you have an horrendous amount of information for each case. To make statistical sense out of this wide assortment of information, you need to group the answers into categories. In statistics these categories are called variables. In computer terminology, they are called fields. Records and fields are the same terms used by most data base software. If you're getting the idea that creating a data base within a statistics package is just like creating one within a computer data base program, you're right. The usual data arrangement is in a table format with each person's response listed in a row and with all of the variables in columns.

Like a regular data base program, the data base portion of your statistics package should help you set up the type of data base you want to use, help you enter the data either by having you answer a series of questions about where the data should go or by allowing you to enter it yourself, and should be able to do some basic analyses on the data you have. The kind of analysis varies from program to program; Statpro (Wadsworth Professional Software, Boston, Mass.), one of the most popular statistics packages for personal computers, for example, will produce summary statistics, such as the mean, standard deviation and number of data points for any particular variable. In addition to these basic statistical features, Statpro will also flag, sort and delete records as well as per-

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CIRCLE 55

Market research, coupled with statistical analysis, is one way to determine what the consumer desires.

form data transformations (such as finding the square root of a number) and conversions (from miles to kilometers), all without ever making you leave the data base portion of the program.

Statistics

The statistics module contains a "library" of statistical procedures that the program can perform on your data, such as cross-tabulation analysis of variance, linear regression, and factor and cluster analysis. These tests do things like summarize the statistics, compare single variables or groups of variables, even plot the results for you to see. The best way to understand what these tests do and how important they can be to your work is to examine a few of the ways that they are used. These tests truly are the heart of statistics.

One of the most common uses of statistical analysis is for market reseach, the procedure we might use to survey sweet and sour candy lovers—and one of the most basic tests used for this type of research is frequency analysis. Say we just wanted to know the percentage of respondents who preferred sweet candy versus the percentage who preferred sour. To find the answer we'd simply tell the statistical software to perform a frequency analysis on the data. The computer would then determine a percentage response for each variable, such as: 34 percent of the respondents preferred sweet candy, 66 percent preferred sour. If we wanted to find out how many women preferred sweet and how many men preferred sour, we would tell the program to perform a cross-tabulation using more variables. Then

CHOOSING A STAT PROGRAM

If you think that a statistics program is just what you need, your next step is to find a package that complements your statistical knowledge and suits your business requirements. Only recently have these programs been available for use with personal computers, so don't be surprised if you don't find a wide variety of programs or programs with an overabundance of features. Don't be surprised either if these packages aren't very accommodating to novices.

Some of the packages that you might take a look at are Statpro from Wadsworth Professional Software (Boston, Mass.) SPSS-PC from SPSS, Inc. (Chicago, Ill.), The Statistics Series and PC Statistician from Human System Dynamics (Northridge, Calif.),and Trajectories from DBi Software Products (Mt. Pleasant, Mich.). These four programs are fairly representative of the types of things you can expect from a statistics package.

If you have a minicomputer or a mainframe at your disposal, however, you might consider using that for your more detailed or complicated analyses. Some statisticians have expressed a dissatisfaction with programs written for personal computers. The relatively small number of variables that a package can accept (usually between 15 and 75) and the limitations of file size seem to be the greatest strikes against these programs. "The mainframe is just too powerful not to use," says Roger Grothe, an organizational research consultant to Sperry Corporation's defense systems division.

An SPSS-PC cross tabulation screen on an IBM Personal Computer.

"It's got an unlimited number of variables you can use. There's really no comparison."

On the other hand, the personal computer (with its accompanying statistics software) is cheaper and more convenient to use than a mainframe. "You're not paying for storage cost, and the only thing you're sacrificing is file size," Dean Neubaeur of Corning Glass points out. "But if you have a hard disk, you really don't have much problem with file size because it can handle quite a bit."

For people who need to do only the most basic of analyses and who have memorized the appropriate statistical formulas, personal computer statistics software may require too much of a financial or time commitment. In these cases, a spreadsheet program such as Lotus 1-2-3 can double as a statistics package. "You can set up worksheets to do some analysis and to create graphs," explains Neubauer. At Corning Glass, Neubauer and his associates use Lotus 1-2-3 for most of their statistical analyses. "Just put the formula into the worksheet, like for a moving average, apply that formula down the column, hit the Return key, and a moving average is automatically generated for those observations."

Neubauer makes it sound easy, but remember, he's a professional statistician who uses these formulas every day. For most of us, recalling statistical formulas isn't something we're likely to be inclined to do. So how you choose to elaborate on, or interpret, the results the package gives you is basically a matter of needs and your own capabilities. The world of probability will never be overcome by exact science.

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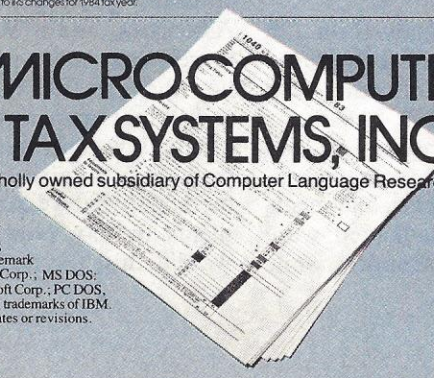

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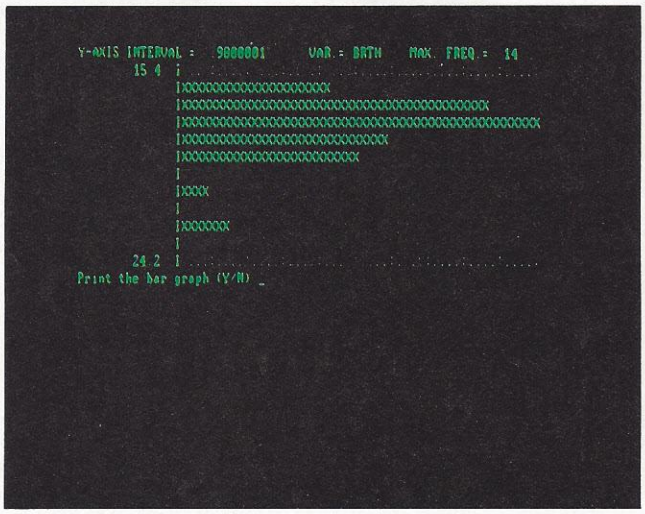

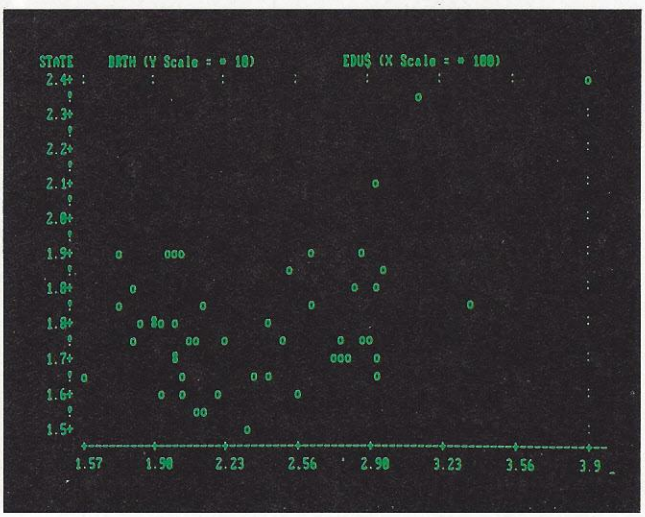

At the main menu for the Trajectories program, select #2, Descriptive Statistics and Plots. Then select #2, Histograms and follow prompts. Return to the menu and select #2, Descriptive Statistics and Plots, and then select #3, XY Scatter Plot (left).

the program would count the number of women and men who preferred sweet candy and the number of women and men who prefered sour and report whole number tallies (and percentages) on which sex preferred what. In such a case, we might find that 12 women and 22 men like their candy sweet while 48 women and 18 men liked it sour. Depending on the number of variables that the program could cross-tabulate at once, we might find out, for instance, that most women with an annual income over $25,000 prefer sour candy, while most men with an annual income over $38,000 prefer sweet. This kind of information can tell us all about who's buying our candy and, thus, where we should advertise the product.

Understanding what the consumer wants should be important to all businesses with a product to sell; market research, coupled with statistical analysis, is one way to determine those consumer desires. According to Dr. Hisrich, who also runs a consulting firm specializing in market research, "For a long time no one took the time to find out what the consumer wanted. Now the companies that do understand are going be successful because they're going to be able to match that need better than anyone else."

In his own market research Hisrich depends heavily on statistical analyses to tell him what customers want from his clients. Such was the case when a supermarket chain engaged Hisrich's firm to find out what a person looks for when he chooses a grocery store at which to shop. After collecting data from the store's patrons and creating a data base with it in Statpro (running on his Apple IIe), Hisrich did a simple frequency analysis test. "In any kind of market research, the first thng you do is a frequency analysis," he says. "Then, based on the responses, you can get a feel for what 'higher order' statistics will be appropriate to use." The higher order (or slightly more complex) analysis that Hisrich chose was factor analysis, a method of data reduction that looks for similar themes in all of the variables and then produces a smaller number of common variables, or traits.

"We did a factor analysis on 126 variables," he explains, "and reduced them to nine common traits that were important to people in chosing a supermarket." The results showed that in some areas an in-store delicatessen, fresh bakery items, and meats which are not pre-packaged were most important to the shoppers, while in other areas off-price and private brand products were preferred. Knowing these preferences, Hisrich could recommend how to tailor each store to meet customer needs; if a deli wasn't wanted in one of the more price-sensitive stores, for example, the space could be used for private brand displays.

Linear regression

In any kind of situation where a process is monitored after a condition is changed, such as in production or research and development, statistics can be of use. Pete Kaczmarek, a production engineer for the chemical group at B. F. Goodrich, uses another typical statistical test, linear regression analysis, to plot the relationship between temperature and melt flow in the production of polyurethanes.

After running experiments and their related analyses using the SPS statistics package from Southeast Associates, and a Wang PC, Kaczmarek can make predictions about how the melt flow will act in relation to different temperatures, all based on an equation generated by his statistics package. "It gives us a predictive method so that we can stop our experiments and say 'Now we know that if we did this, the melt flow would do

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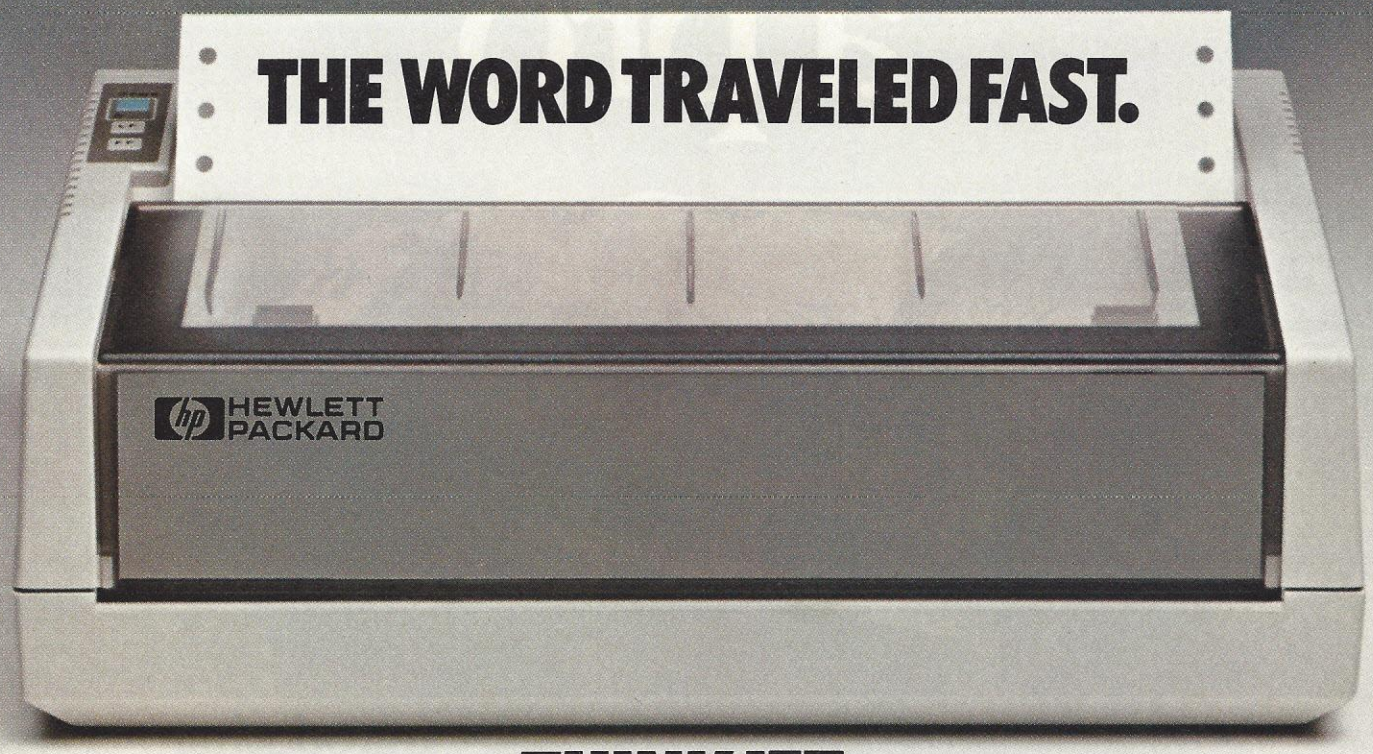

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that' because our line tells us that's what would happen," Kaczmarek explains.

A similar predictive method is stepwise multiple regression, a routine that picks the best predictors for you from a large number of variables. If you wanted to find out what factors influence the stock market, for example, this kind of analysis would help. The first thing to do is to collect information on a number of variables that you think might influence the market for the last year, such as the daily temperature in New York City or a change in the Federal Reserve Board's discount rate. You then take the information for each variable for every day within the last year and, along with the number at which the Dow Jones closed for each day, input it into your computer. The program will then analyze each variable one by one to choose the best market predictor. Once the best predictor is chosen, the stepwise multiple regression routine will test that variable against the next variable to see if the latter makes any difference in the prediction and choose a second best predictor, a third best, etc. You might find, for instance, to everyone's surprise, that the average length of American women's skirts is the best stock market correlation there is.

Graphics

Each of the two main features of a statistics package, the data base and the statistics modules, are necessary for doing statistical analysis; it would be pretty difficult to run a test without data or without a mathematical formula for that test. But for those of us who don't always appreciate what the numbers say or for the statistician who must present his findings to a group of non-statisticians, a graphics package can be just as important. That's why a graphics feature in a statistics program is becoming standard equipment these days.

Once you've finished the analyses in the statistics section of the package you can transfer your results into the graphics section where the program can immediately turn them into graphic presentations for your screen or printer. Some of the more frequently used graphs include scatter plots, histograms, linear regression plots, even bar graphs and pie charts. Some of the lesser known might be cluster analysis dendrograms, Andrew's Fourier plots, and bivariate scattergrams. If your statistics package, computer and printer or plotter are agreeable, these plots, charts and graphs can be displayed in a variety of colors as well. This comes in handy when you need to differentiate certain lines or to highlight an important point.

Erroneous results may be prevented by making sure the measurement technique is correct and repeatable.

The graphics feature also normally includes an editing function so that you can insert labels and legends anywhere you want in the graphs. One program that offers such an editor is SPSS-PC (SPSS, Inc., Chicago, Ill.), a statistics package recently made available for use with IBM XT and Compaq Plus personal computers. (Its progenitor, SPSS-X, is one of the most popular statistics programs around for use with mainframe computers.) With SPSS-PC you can label variables and values, using up to 40 characters for variable labels and up to 20 characters for value labels. Not many statistics packages offer that kind of detailed labeling work.

There are, of course, many other features that a statistics package might offer in addition to the data base, statistics and graphics components. As the packages become more tailored to business, things like report generators and micro-to-mainframe communications links will become more prevalent. One feature that you'll probably never see, though, is a interpreter. That function is up to you, the user.

Statisticians agree that most statistical analyses are open to interpretation. The program can organize and classify your data and it can do the necessary analysis, but the numbers it generates may yield more than one interpretation. Your knowledge of the situation, your experience and your judgment are what make you uniquely qualified to interpret those results. Says Dr. Hisrich: "We can get some data and some analysis on which we can base our decisions and have a greater probability of being right, but we still have to make the decisions."

As you might expect, making those decisions isn't always easy. As Dr. Hisrich points out, "You have to be very careful that the results you have perceived in the data are, indeed, the results that are there. Some company may be investing a significant amount of money based on your recommendation."

One way that you might prevent erroneous results, according to Dean Neubauer of Corning Glass, is to make sure that your measurement technique is correct and repeatable. "Someone can stick a bunch of data on your desk and ask you to analyze it. You can run it through the computer and get a bunch of numbers, but not knowing where the original data came from can lead you to the wrong conclusion." If the data collection method was wrong—for instance, if too many samples were taken during a short period of time (rather than over a longer period of time when you could see shifts up or down)—you could be led to the wrong conclusion. "But if you've got confidence in your numbers," he says, "you should have confidence in your results."

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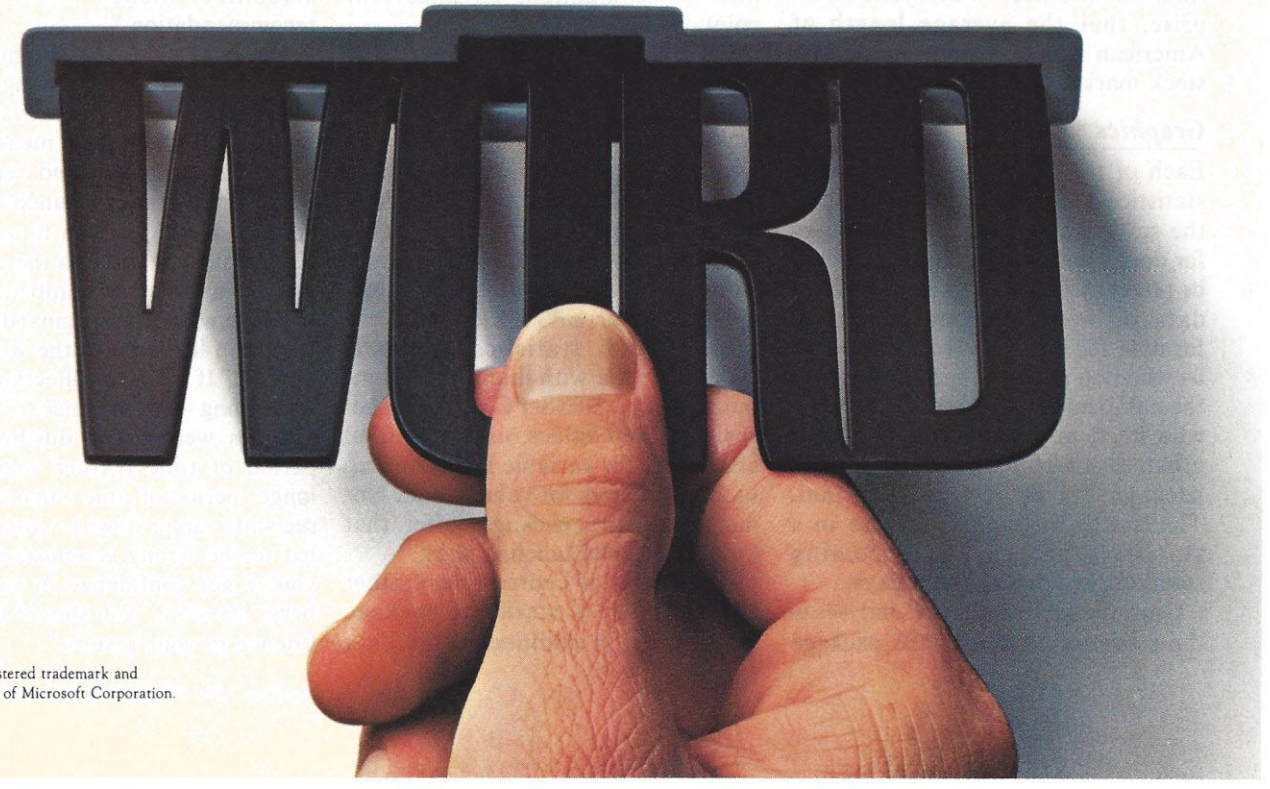

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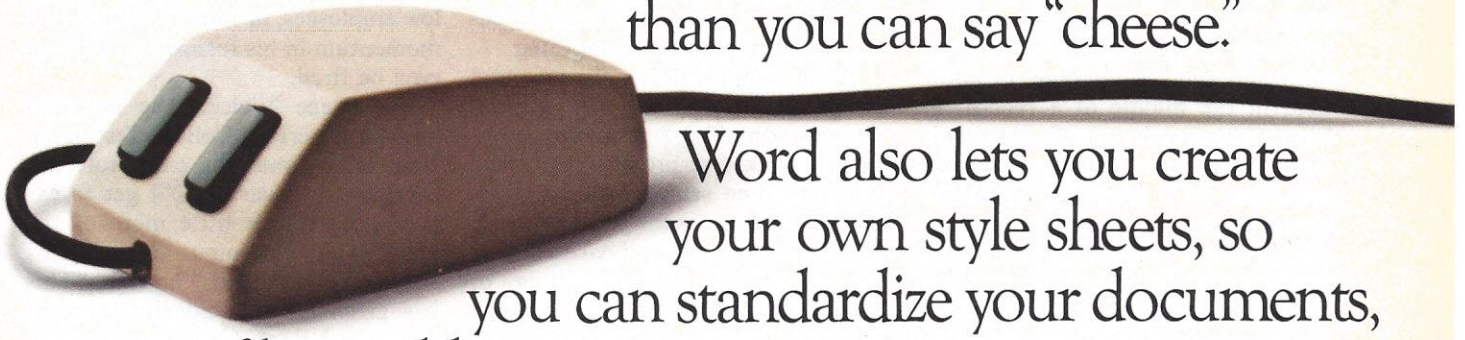

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How To Find (And Use) The 'Company Guru'

The role of an informal personal computing expert often means power and rewards, as well as risks

by Henry Weiss, Associate Editor

When a Baltimore sales representative for Cargocare, an Amesbury, Mass., manufacturer of industrial humidity control equipment, wants to change the column width on his spreadsheet for tracking unit sales and commissions, or add a field in the middle of a record, he knows exactly who to call. He gets in touch with Lew Harriman, market manager. It is no fluke that Harriman is the first one called at Cargocare when there is a question or problem with the company's string of Lotus 1-2-3 packages, even though he has no connection with the data processing team. He is, instead, well recognized as Cargocare's personal computing "guru."

Nobody formally bestowed that title on Harriman, or on any of his counterparts in companies wherever personal computing has taken hold. Being a guru is simply being the person who comes to be relied on for assistance because, well ... he, or she, just always seems to know.

As companies embrace personal computers, few have foreseen a formal role for pathfinders, guides to the new technology, but they have emerged spontaneously to fill the obvious need. Typically, these gurus are not data processing professionals—they are financial analysts, marketers, managers and accountants. They acquire their informal roles because they are hobbyists or because they became ardent users after being exposed to personal computers on their jobs. And these gurus can help managers and coworkers alike over the various hurdles that may be encountered in personal computing.

In the simplest form, the informal guru's role involves clearing program logjams or making sure all the equipment is hooked up properly. But some gurus become semi-formal adjuncts to the data processing department. They act as sounding boards during the initial stages of system design or programming, and they may even be given the charter to purchase new hardware and software. Occasionally, these gurus are later canonized as part of the professional data processing group; sometimes they begin whole new careers on the outside.

The immediate rewards of being an informal company guru are, of course, attention and recognition. This may lead to a new job, or at the very least to advancement and pay increases in the guru's formal position. In addition to these concrete compensations, the guru has the satisfaction of bringing a powerful tool to business professionals, helping them get beyond any frustration with it, solving crises and contributing to a company's improved efficiency. Informal gurus also learn by exercising their roles. They may be able to spot new computing techniques as the people they help begin to solve problems in their own way. But there are also risks. The informal guru can be overworked to the point of burning out. He can be resented or feared by fellow employees, or lose credibility and momentum in his formal job. He can even be fired.

For Bruce Nielsen, the informal guru at American College Testing, in Iowa City, Iowa, the extra role has been richly rewarding. "I get to expose people to a little more of the black magic of computing—in terms they can understand," he says. "This has given me a wonderful sense of accomplishment. If people are going to be happy they must go away with this feeling every day. This is my major reward." Nielsen's informal role also gives him a sense of being irreplaceable, which he finds comforting even though as vice-president of operations he is one of the top executives. In organizations like American College Testing, where there isn't an army of data processing personnel trying to regain control of personal computing, the role of informal guru is waiting to be acquired. As with Nielsen, this usually happens by the free and natural expression of enthusiasm for the technology—the pro-

Can you spot the guru?
When employees at Cargocare have questions about computing, they turn to the company's informal guru, market manager Lew Harriman, (upper left corner).

Photograph by Larry Williams

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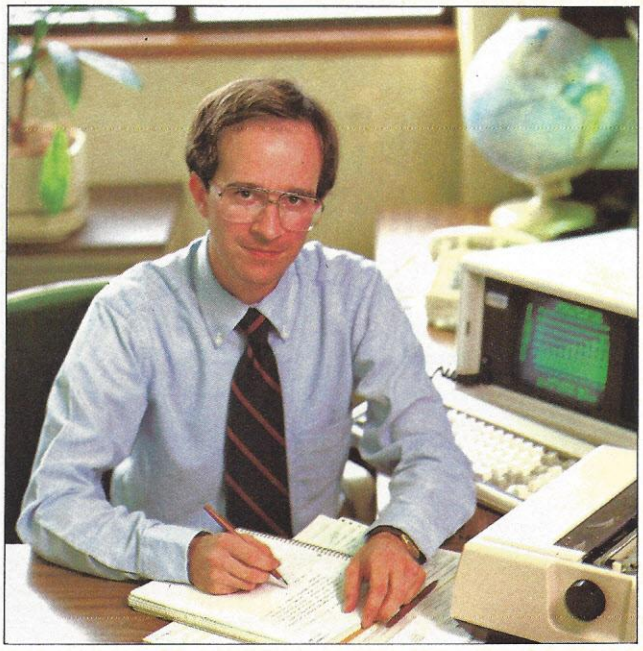
cedure is also, generally, unpremeditated. Lew Harriman is an archetypal example of such a process.

Harriman's story begins the way it has for many other personal computer enthusiasts—with a vision. Before he went to work for Cargocare, when he was still in the Air Force in Omaha, Neb., working on bachelor and transient housing policy, he became intrigued by small computers. Reading about them in science magazines, he quickly saw their phenomenal potential. "It was amazing to me that one day individuals would own such powerful tools," he remembers thinking at the time. "It would give them the chance to control the technology rather than the other way around."



Photograph by Larry Williams

"If I see a way of making a situation better I push until they say yes or tell me to get lost."

—Lew Harriman

A few months after Harriman started with Cargocare as customer service manager—in late 1976—the company received an IBM 5100 it had ordered months earlier. The 5100 was the prototype of IBM's Personal Computer. "When it came, a few of us shut ourselves off in a corner and taught ourselves IBM BASIC," Harriman says. The 5100 had a good built-in tutorial, but it took Harriman about a month to go through the lessons. His first program, for printing simple product reports, took about 18 hours to write, spread over several weeks. But it was too cumbersome to use, he says.

Harriman's second program, which took about twice as long to write, was a success. The program was designed to analyze the performance of Cargocare's heat exchange equipment. He chose this problem because he thought it was ideal for learning how to program, and because that market was growing rapidly. Cargocare also makes humidity control systems that are used in the manufacture of integrated circuits. Its systems are used by, among others, Intel in the production of its 8088 chip (used in the IBM Personal Computer) and by Motorola in the manufacture of its 6800 microprocessor (used in Apple's Macintosh computer).

Because of his accomplishment, Harriman started to get attention as a quick learner of the technology. Without thinking of this work as the start of an informal role he continued to write programs, because he had become a fervent convert to computing. From then on he found it natural to be evangelical about personal computers. "That's just the type of guy I am. If I see a way of making a situation better, or helping someone, I push until they say yes or tell me to get lost," he says.

Through the years, Harriman's lobbying efforts and enthusiasm have given him high visibility as a knowledgeable resource on personal computers. Fellow employees have come to him with computing questions and he has slowly acquired a reputation as the company guru. When Cargocare wanted to revamp its system, the management listened to Harriman's suggestions. This spring the company supplied its entire sales force with Compaq computers and copies of Lotus 1-2-3, after Harriman pushed for this move with missionary-like zeal. Harriman actually purchased the equipment and software. Since then he has been barraged with questions by salesmen in the field who are baffled by the installation procedure or perplexed by the intricacies of a spreadsheet.

Managing this demand on one's time can get tricky. "It's very much situation specific," Harriman says. "If someone is calling me I know that they've probably gotten themselves into a problem and have reached peak frustration, so I try to handle the problem right then on the phone." He says that 80 to 90 percent of the questions he's asked can be answered quickly—usually in one to two minutes. But other questions can take half an hour or more to answer. In these cases it sometimes becomes necessary to schedule an appointment or even have people call him at home. Then again, he may just be grabbed at the end of the day informally.

Pressed for time

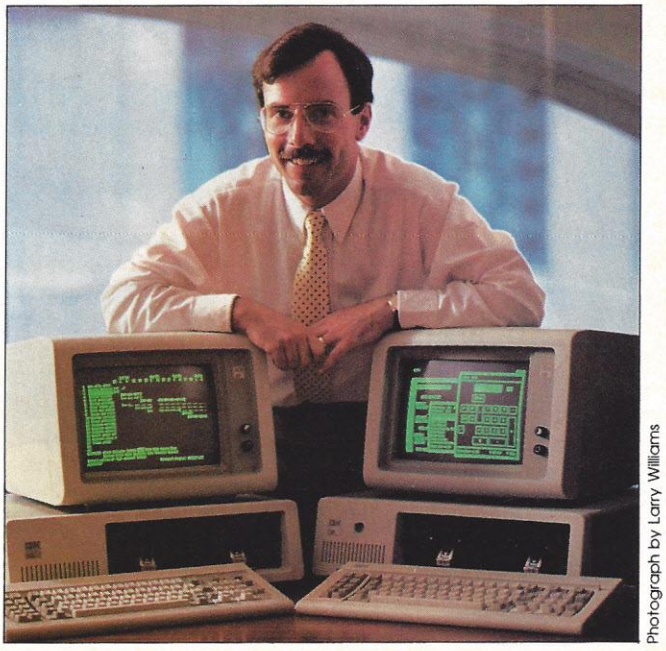
The guru can get so caught up in his role that it becomes difficult for his manager or coworkers to get to him with their questions. Like almost any

other resource he has to be managed well to be used effectively. For a company, this means making sure he gives attention to the problems top management considers the most pressing. For coworkers, it means learning to seize opportunities that can arise unexpectedly.

This happened recently, when the president of Cargocare, John K. Whiting III, ran into Harriman on the second floor of the company building at the end of the day. "We talked about word processing," Whiting relates. "We've been thinking about using Symphony so I had Lew go up to a demonstration of it and come back with a recommendation. He recommended that we didn't go with the product so we were discussing the alternatives. This is the way it usually works, its informal right down the line." So informal, in fact, Whiting usually goes to Lew's office when he has a chance, if there is an ongoing issue to discuss. "If he's busy I'll ask him to give me a call when he's free. We all recognize that first things come first."

While Harriman is considered the resident expert on personal computers, Whiting has been a major force behind the growth of computer use at the company. He bought his own IBM Personal Computer before the company bought one. Now there are about 19 personal computers in the field and six or seven scattered around the central offices.

Not every informal guru starts off with a predisposition to personal computer technology. In fact, some start off with something akin to dread. This was the case with Dr. John Burns, a veterinarian who has just become a senior staff scientist at Hazleton Laboratories America, Inc., in Vienna, Virginia.



Photograph by Larry Williams

"The industry was developing fast. We thought of ourselves as the bearers of good tidings."

—Tod Riedel

Burns was forced into learning how to use a personal computer in 1982, while doing some data handling work on a two-year toxicology study being conducted by an independent pathologist. At the time, he was working for International Research and Development Corp. in Mattawan, Michigan. As the end of the study approached, it became clear that organizing and interpreting the data by hand would be a monumental task. "A typical study uses 300 to 500 animals," says Burns. "From each animal 40 to 50 tissue samples are collected—that's 20,000 tissues, each of which is diagnosed in two ways—resulting in 40,000 pieces of data." A personal computer was the obvious solution. Burns knew this because he had been exposed to computers in his analysis work at International Research. But he knew nothing about how to make computers work, and he didn't relish learning.

In October of that year Burns finally gave in to the inevitable and bought an IBM Personal Computer. He taught himself programming with books on BASIC and "by spending a lot of time reading the IBM manual." Although this activity went on outside the office, Burns' coworkers soon discovered his growing computer skill. "You become very noticeable when you use things that other people don't and speak about it in a special language," he says. The other pathologists began going to Burns with programming questions. So, although he had not looked for his informal role, it was soon thrust upon him. "It just happens," Burns says. "You help one person with a problem, then there are two people at the door, and then suddenly there are four and eight."

While gurus may hit upon their roles, in some sense, unknowingly, they become much more conscious of fulfilling their informal mandate once they have it. They welcome and encourage questions from coworkers and management. Gary Eiserman, who served as controller and informal computing guru at First American Bank of Washington, D.C., for almost two years, started a user group at the bank to promote use of personal computers and to create an environment for questions that was free of the caste barriers caused by his top management position. "Junior officers were reluctant to come to me with questions—especially if they thought I would consider the questions picayune. So, I got the user group (the Washington, D.C., Fi-

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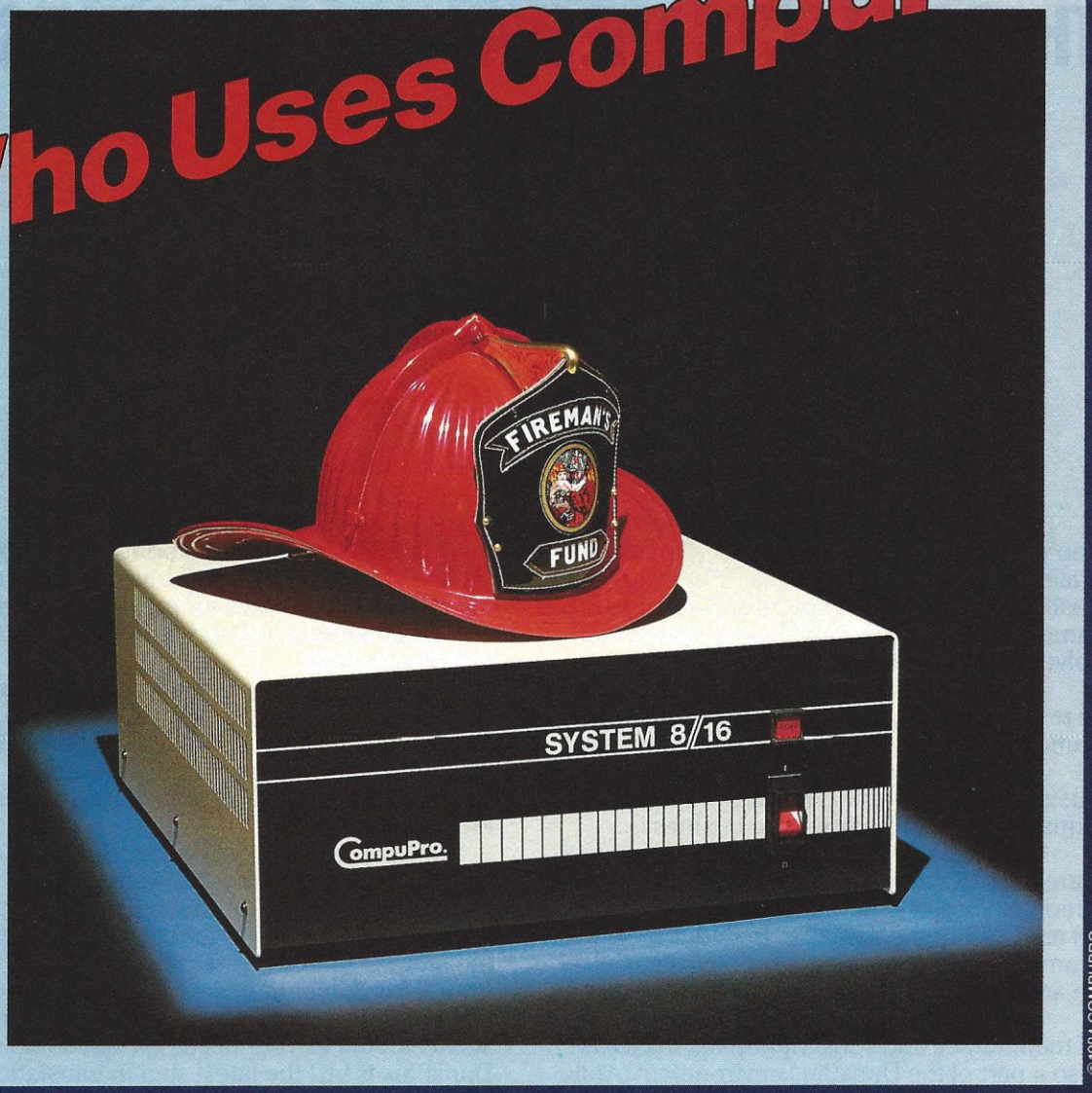

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nancial User Group) going, invited vendors to make demonstrations and taught a course in Multiplan at the bank."

A computing advocate

Eiserman took his role very seriously and considered it his responsibility to look for ways he could help the bank automate. Each month the bank's officers met to discuss earnings, and Eiserman hawked personal computing. He tested software packages on his own and went to other departments of the bank to make suggestions about systems. For example, he tried to talk the personnel department into a resume tracking system. "I was very proactive," he says. "I tried to show how great the technology is; I pushed it."

Photograph by Larry Williams

"I was very proactive. I tried to show everyone how great the technology is; I really pushed it."

—Gary Eiserman

According to Eiserman's boss, Jerry Kennedy, these efforts "paid off in spades. We have been on the leading edge at our bank in integrating this (personal computer use) into our work." Kennedy supported Eiserman's informal role by making sure he got all the computer publications he needed to keep up with the industry, and by approving the purchase of a number of personal computers for Eiserman's area. Outside of that, he kept abreast of what Eiserman was doing through an individual meeting once a week and a department heads meeting once a month. "At Gary's level there is a different kind of supervision than with someone at a lower level. You expect a high degree of initiative, and as long as we were in agreement about the priorities I left him to manage his own time."

But Kennedy did ask Eiserman to spend time with other department heads who reported to him so they could get started with personal computers as well. It was a matter of spreading the knowledge around and prioritizing efforts. "There are always going to be scheduling problems, and some things have to be shoved onto the back burner." This was where Kennedy sometimes stepped in.

Not every guru is as aggressive as Eiserman. Harriman is also proactive, but in a quieter way. "When there is a decision to be made, or I know of a problem that needs solving, I look for opportunities to inject myself in conversations that I can steer to the appropriate subject," Harriman says. Perhaps Nielsen summed up this stance the most succinctly: "You have to be on the hunt, ears perked."

Gurus don't always have to chase problems, however. Most often, in fact, the problems come looking for them. After Tod Riedel started his tenure as informal guru at Laventhol & Horwath's Boston office in 1979 and '80, he was sought out constantly by telephone. Even people in some of the other offices of the Philadelphia, Pennsylvania-based CPA firm would call looking for advice on automating a particular function or with startup problems. "I would have to go through the whole process over the phone," he says. "I would tell them to insert the disk and close the door; they would say, 'I'll be right back.' There was a lot of this. I would run programs in parallel or mentally envision what they were going through."

The guru's help is also solicited more spontaneously. "One time," recalls Nielsen, "when I was sitting in the cafeteria having lunch, the vice-president of the distribution center sat down and asked me some questions about an inventory control system. This is typical. In the early days I wasn't very smart, so when people started off on a long description of what was going on in their job I didn't take notes. Now I see it coming and take notes right away."

Harriman's experiences are quite similar. He has often been buttonholed on a problem while "chatting about life's little frustrations" at the office coffee machine or in the cafeteria. One alert sales representative, Norman Simeone, president of Simeone & Andrews, Inc., even managed to snatch some of Harriman's time while being given a tour of Cargocare's offices.

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tives get a personal computer to run the program. But Simeone knew "never to trust the first person you talk to about computers" so he was looking to find a number of sounding boards. He found one in Harriman. "I spotted a few copies of personal computer magazines on his desk," recalls Simeone. "So, I asked him some questions about equipment and saw immediately that he knew the buzzwords and had researched the subject. From then on I went to Lew."

Simeone's accidental discovery of the guru at Cargocare points up the informal way gurus are usually found. Attention to such things as who reads computer magazines, who hangs around the office personal computer, or who gets pointed to when questions about computers arise are the clues to uncovering the company guru.

When Chuck Zuppann, a senior programmer at International Research and Development, was looking for information on data in one of the company's systems a few years ago, people in the pathology department kept deferring to John Burns. "I began talking to him and we found we could confide in each other," says Zuppann.

Over time Zuppann and Burns developed a solid support relationship. When Zuppann was assigned to redesign International Research's internal system, he turned to Burns for input on the design. By doing so he was avoiding the formal channels of information, but he knew he could get answers more quickly from Burns. "And he would explain these things in terms I could understand," Zuppann says. To keep this resource informal and private, Zuppann sometimes had to make sure that nobody saw him go to Burns' office. The end result was worth the subterfuge. "There is no question but that I couldn't have done nearly as good a job without John. The fact it was informal was the key. Formal things tend to have lots of paperwork—sometimes you just need to do it by shooting the breeze."

Burns sees his experience as an informal guru as being very similar to his clinical experience as a veterinarian. "You must be a good observer and diagnostician," he notes, "to see what is actually happening, not what you think is happening .... You have to probe and prod."

But careful observation and lengthy discussions are not enough for the guru to carry out his role. The guru also usually has a good grip on the company's business, according to Harriman. "You must understand what the other person is trying to accomplish to help him," he says. Beyond this, gurus need a good understanding of the personal computer industry so they know what software is available and what to expect from hardware vendors. They read trade magazines and newsletters, participate in user groups and attend trade shows.

Keeping abreast of the personal computer industry and carrying out the role of informal guru can be very time consuming. When Burns became involved with the redesign of International Research's internal system—which had been configured and written by an outside consultant around a Z80 microprocessor—he ended up spending most of his time in his informal role. He was lucky to have a division director who supported him in this activity. To a certain extent, the director lightened Burns' pathology workload to give him the time he needed to work with a programmer from the data processing department.

Riedel's employer was not so sympathetic. Although his boss was almost as excited about personal computers as he was, Riedel still had to maintain a certain level of "chargeable time" doing feasibility studies on prospective hotels and operational audits on existing hotels and restaurants. This meant working a lot of extra hours—often Friday nights, Saturdays and Sundays—because his informal role came to occupy 25 to 50 percent of his normal work day. In addition to attending to problems encountered by novice users in his firm, Riedel was building feasibility models on the Apple IIs the company had purchased.

Ample rewards

In spite of this bone-wearying commitment of time to their informal roles, Burns, Riedel, and the other informal gurus all believe they are amply rewarded. For Burns, the most concrete reward was that his role helped him get a new job at Hazleton Laboratories America, Inc., in Vienna, Virginia. His move to Hazleton was prompted by a desire to return to the Washington, D.C., area, where he had worked for five years in the late 1970s. His informal role at the Mattawan research company came up when he interviewed at Hazleton. "I think it played a part in the decision to hire me, because the laboratory is thinking of using personal computers more extensively," he says.

Riedel also found it easier to make a change because of his informal role. In 1981 he fulfilled a dream and entered Harvard Business School. He managed to work his informal role experience into the application and is convinced it helped him get accepted.

Perhaps the most concrete of all rewards for the role is advancement in a chosen career, with its concomitant growth in salary. Cargocare's Harriman is a good example of this. Although he insists that his climb from customer service manager to junior product manager and finally marketing manager cannot be solely attributed to his adoption of the informal role of programmer and "sounding board," he does acknowledge its positive effect on his career. "It was one of the ways I showed I was willing to work hard and could learn quickly," he says.

While these concrete rewards are satisfying, probably the most attractive premiums of being an informal

guru are emotional. "It's wonderful to help people and watch them learn that they can do something they couldn't do before," says Harriman. Burns had the added reward of working on problems that had immediate and clear-cut solutions. "It was satisfying to look at a problem and find a solution without having to wait the two to three years it takes to get results in chemical safety studies," Burns says.

Like Harriman and Burns, Riedel feels his primary reward has been personal. "It was an exciting time (the 1979 to '80 period in which he acquired his informal role)," he explains. "The industry was developing fast and those of us who got the bug thought of ourselves as the bearers of good tidings. We were bringing technology to other people." So seductive were these rewards for Riedel he decided to turn his informal role into a formal career. After graduating from Harvard Business School in 1983, he established the First Micro Group in Boston. The company provides training and consulting services to business users of personal computers. He says his excitement level now is as high as it was in the early days of his personal computer infatuation.

There are also rewards for the people that use the guru as a resource. For example, Zuppann found that working with an informal guru was faster and easier than going through the formal channels. Simeone says the informal guru is more accessible. More important, he says, is that an informal authority like Harriman is more likely to admit the limits of his knowledge. "A person with a formal role has to have the answers—he's up there on the platfrom," he explains. "Because of this he's more likely to give answers even when he doesn't really know." So, the guru is a valuable resource that saves managers and coworkers from making costly mistakes. They have no ax to grind and no formal conventions to adhere to. The one proviso, according to Simeone, is that the guru's knowledge can be too limited for special situations. Then it may be important to go to an expert after tapping the informal gurus for what they know.

But there is also a dark side to the role of informal guru. Burns and Riedel experienced it as a loss of time and being overworked. Riedel reached a burn-out period when he found he could no longer expend energy on convincing people to see the benefits of computing. His idealism was broken by the reality of working for conservative top executives. "They didn't see why computers should be used when they weren't around in the early days of their careers. I didn't expect them to fall on the floor in awe, but I did expect them to explore possibilities. When I saw this wouldn't happen I stopped overworking and pulled back."

The risks of the role can be even greater. Eiserman learned this the hard way. On March 30 of this year he was fired. Ostensibly the reason was "a difference of style" between Eiserman and his boss. Actually, claims Eiserman, he had become too vocal and successful a proponent of personal computers, and his boss felt threatened. Eiserman's boss, Jerry Kennedy, would not comment on the reasons Eiserman left the bank, but he insisted it had nothing to do with the role he fulfilled as guru.

Today, Eiserman is working as the president and chief salesman of his wife's company, Rent-A-Computer Corp. He says that being fired destroyed his banking career. He was chairman of the Bank Administration Institute's accounting committee, but when he lost his job he was thrown off the committee. "I was shocked," he says. "Everybody at the bank, from the chairman to the people under me, had told me I was doing an outstanding job."

What happened to Eiserman is proof that informal roles have to be handled carefully. Being sensitive to the reactions of fellow workers and management is the first axiom of such a position. "You have to be careful not to push too much," says Harriman. "Otherwise people will start to say: 'All this guy thinks about is computers.'"

It has happened to Harriman, so he continually watches for the subtle signs of impatience. "You can tell when someone has heard enough about personal computers and wants to hear instead if we have booked enough orders lately," he says.

Nielsen sees the hazards of being an informal guru from a more political point of view. "Computers rearrange the classic political structure of management," he says. "I have seen a programmer dictate to a top level manager what he could and couldn't do with his whole area of responsibility. Power has migrated from the user realm and become lodged in the programmer's area." Bearers of informal roles have to be conscious of how they also shift the power structure by wielding personal computer technology, he adds. Nielsen's thoughts are drawn from 16 years of experience in the data processing field as well as his recent experience as an informal guru at American College Testing. He left data processing because he "wanted to explore other frontiers."

There is no denying the risks of adopting an informal role as a company's personal computing guru. But they are risks that can be avoided with a little sensitivity and tact. The rewards, on the other hand, can be substantial. The guru is in the spotlight at a time when personal computer use in business continues to swell. Demonstrating mastery of the new technology in addition to performing well at a chosen job can bring rapid advancement and personal gratification. Perhaps the surest sign that the rewards of becoming an informal guru outweigh the risks is that Harriman, Burns, Nielsen, Riedel and even Eiserman would all do it again.

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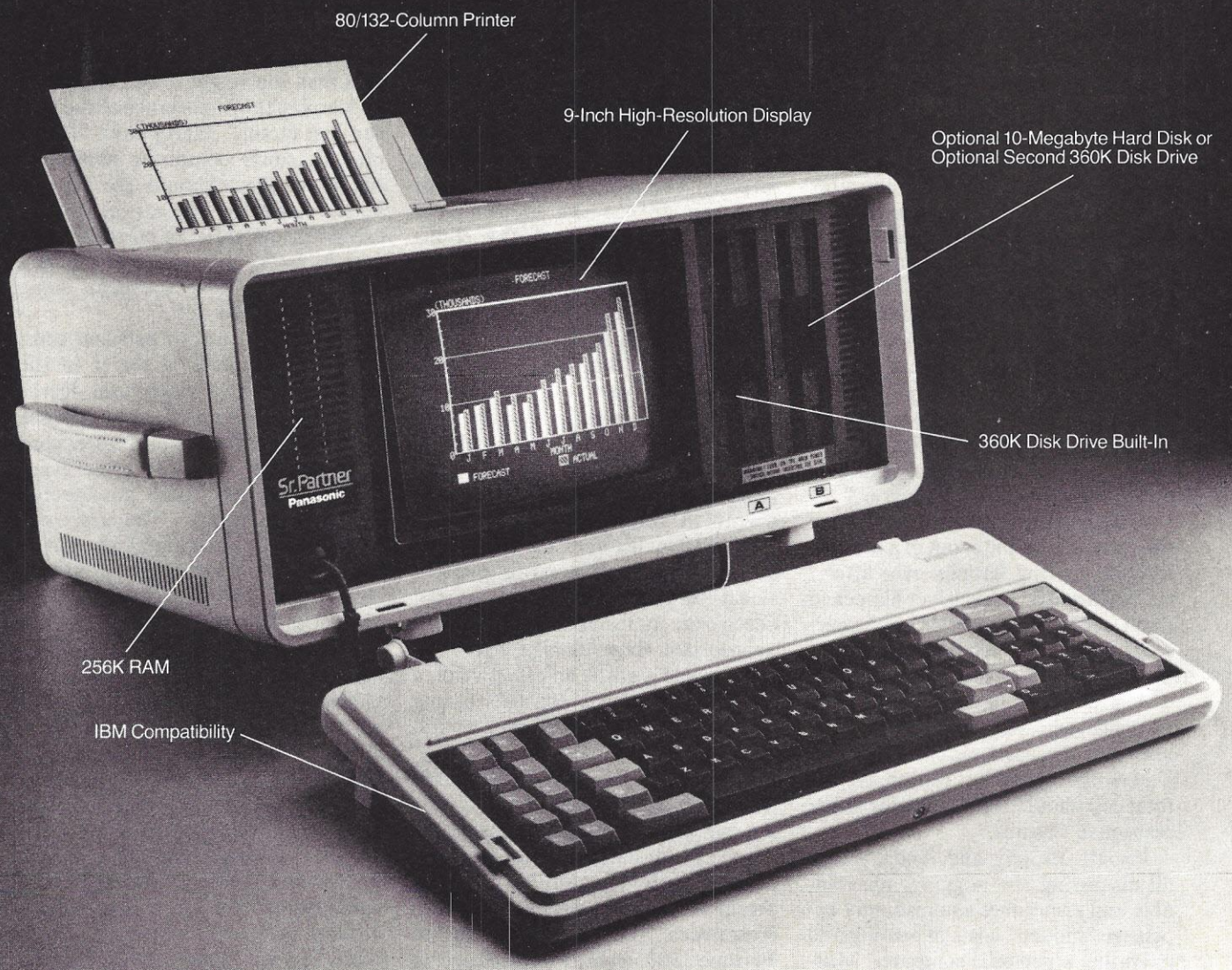

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CIRCLE 101

Cutting Through The Hidden Costs Of Computing

Forewarned users with a plan can defuse spending—turning it into an investment in productivity

Joseph Brophy, who probably manages more personal computers than any other corporate executive, muses about the overhead endemic in the process. Ray Pironti, a computer specialist at one of America's largest pharmaceuticals companies, thinks personal computer users have been misled. And Dorine Andrews, president of Performance Resources, Inc., an Alexandria, Va., technology consulting firm . . . well, she is piqued almost to the point of advocating physical remedies.

"Every user must make a significant investment in the computing process after the initial purchase," Brophy says. "There is a lot of overhead involved. It isn't simply a matter of buying a boxful of computer."

"The hoax is the line that you can take a microcomputer out of a box and start computing happily ever after," claims Pironti. "It has never happened that way. The purchase price of a personal computer is just the beginning of the user's expenses—not the end."

Andrews tries to make a joke of it: "Anyone who has ever convinced a user that the basic purchase price of a personal computer represents the total cost should be hung by his or her respective thumbs."

Pironti, Brophy and Andrews are all discussing the nagging, unavoidable and sometimes astonishingly expensive "hidden" costs of owning and operating a personal computer. Musings, beliefs and jokes to the contrary, however, legions of experienced users have found it worthwhile to press on through and reap the benefits of personal computing. They point out that hidden costs detract from a system's utility only when they come as a total surprise. There are many techniques that can defuse the hidden cost syndrome, starting with the elimination of the surprise factor.

In the final analysis each personal computer user must assess his or her individual needs to accurately gauge and effectively disarm hidden costs. After all, beyond a basic system, requirements can range from the minimal for now-and-then weekend home computing—a single software program and a kitchen table on which to operate the computer might suffice, to a full-blown list for the day-in and day-out computer-using professional—a host of peripheral devices, accessories and support costs may be appropriate. Regardless of where you are along this scale, an effective plan will go a long way toward turning would-be hidden costs into an investment in productivity.

Simply knowing that hidden costs lurk in the background of every pending computer purchase is probably the most valuable defense that there is. As pointed out by Richard Vierck, vice-president of administration at Pacific Resources, Inc., a Hawaii-based Fortune 500 energy company, to be forewarned is to be forearmed.

"Personal computers have become such incredibly powerful tools in business that you've got to be careful not to overplay the importance of the hidden cost factor," Vierck says. "If you plan personal computer purchases correctly, there should not be any horror stories. If you expect to fully exploit the potential of personal computers, you've got to accept the fact that you will have to spend some money along the way."

The hidden costs of personal computers aren't really a secret in the traditional sense. Every user learns about them sooner or later. Anyone who has ever plugged in a power cord or connected a printer cable eventually confronts some unexpected additional expenses. The user who hasn't spent a substantial amount of money over and above the initial purchase price of hardware and software has yet to be born.

The hidden costs of using personal computers don't really involve unknown, inexplicable processes or gadgets either. Most every hidden cost is a rather mundane and predictable necessity. For individuals, it might be the $50 power surge protector or the $300 work table. For small businesses, it could be the $150-a-month service contracts or $25-an-hour computer tutors. For large corporations hidden personal computing costs could be a six-figure tab for rewiring

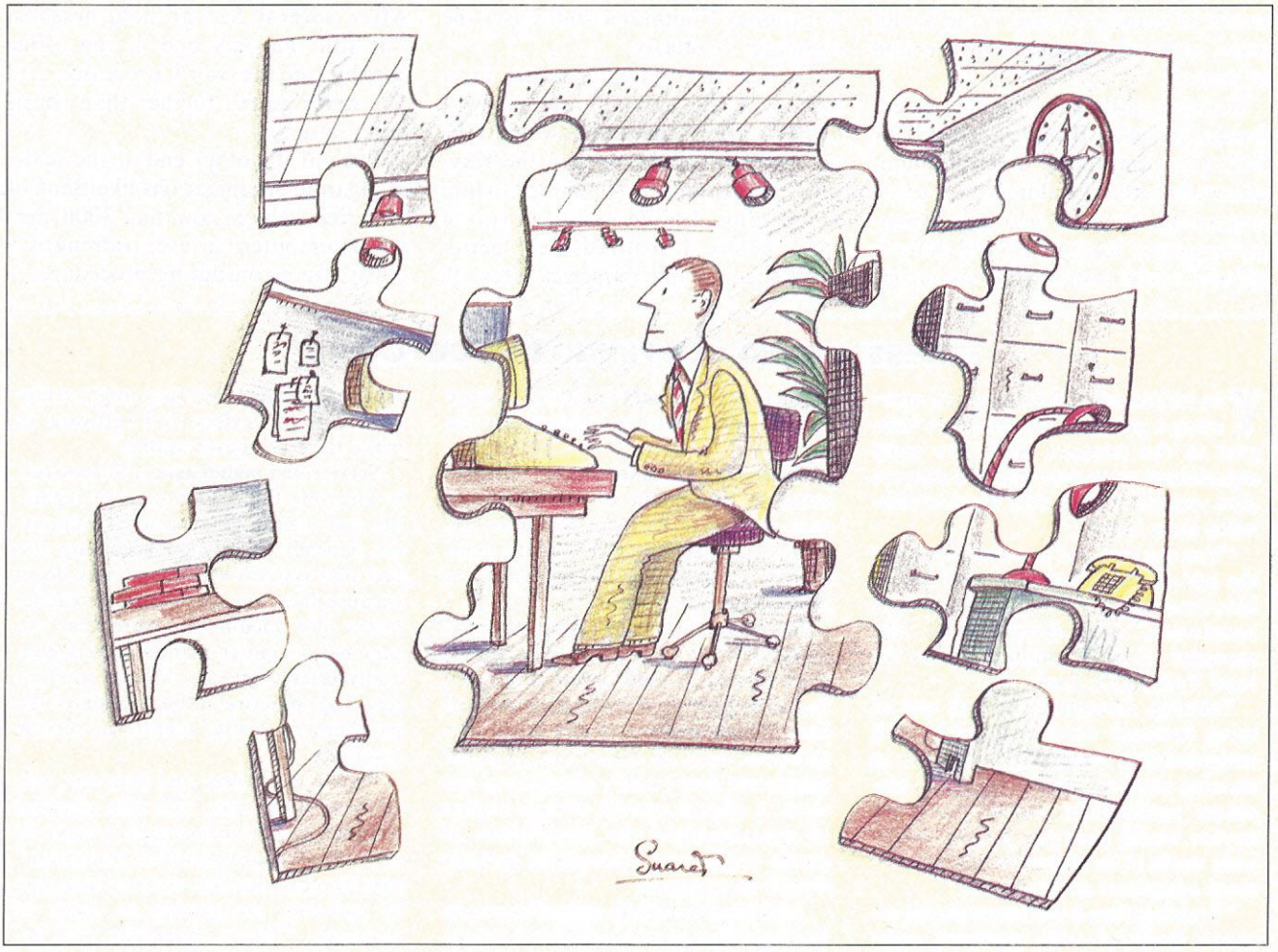

Illustration by J.C. Suarès

and construction work or another big bill for the cost of replacing obsolete computers with newer, more practical systems.

In the first year of operation, a personal computer purchased for about $2500 may run up thousands of dollars in additional costs, suggests Richard Dalton, the president of Keep/Track Systems, a San Francisco computer consulting firm. That estimate includes the equivalent of one month of the user's time devoted to learning the computer, perhaps $1000 worth of annual repairs and maintenance costs, upwards of $1500 worth of added software, hardware, supplies and electricity, and other necessities.

"The actual cost of operating a computer is frightening for people who expected their spending to end after their initial purchase," Dalton says. "Sometimes people can't believe they spent $10,000 for a computer in the first year. These costs are pretty damned insidious. They creep up on you without notice."

While user experiences differ, it is clear that the largest and most universal hidden cost associated with owning and operating personal computers is training. Hidden training costs take any number of forms. There are the simple outright training expenditures, of course: hiring tutors, paying for training courses or the expenses involved when a company forms, staffs and operates an internal personal computer support group. But there are also more subtle training costs: the value of the time it takes individual users to learn how to operate the computer; the value of productivity lost while employees become computer proficient; the cost of time lost attempting to train employees who never do learn how to use computers; and even the cost of the time involved when skilled users interrupt their own work to assist less skilled employees with a personal computing problem.

"No matter how you cut it, training is the key hidden cost of personal computers," contends Pironti, who manages about 60 personal computers at the United States pharmaceuticals division of the Schering-Plough Corp. "It's the key cost because it's a

matter of employee time. Time is a lot more expensive than hardware and software."

Training costs have become so expensive for Alan Bromley at his New York City marketing and communications firm that he almost gave up on computing. About a year ago, Bromley bought a Kaypro II. But after a series of costly training fiascos, no one at Bromley Communications uses the computer regularly.

"When the machine came in, I looked at the manuals and knew I couldn't afford the time it would take for my own people to learn the Kaypro," says Bromley. "I planned to hire an operator. I hired and fired two of them before I realized we'd better learn the machine ourselves after all. After several $25-an-hour lessons, I'm still the only one in the office capable on the word processor and I've never gotten further than (business) letters."

Even at the other end of the scale, at gigantic organizations like Bank of America, which now has 3000 personal computers in use, training is a costly, time-consuming procedure.

UNDERSTANDING COMPUTING'S HIDDEN COSTS

The hidden costs of owning and operating a personal computer are integral to the process. Still, the most experienced users note that you can prepare yourself to deal with them to minimize their impact.

"You can rant and you can rave about the add-on costs, but you can't run or hide from them. All you can do is your homework," says Jerry Burden, the manager of office automation at the New York Stock Exchange.

Training. Accepting the true cost of using personal computers starts with understanding the expenses involved in training users to operate personal computers proficiently. No matter what anyone would have you believe, everybody needs to be trained to operate personal computers and software.

"Training time is the most critical expense involved with personal computers," says Joseph Brophy, who manages 8000 personal computers at The Travelers Companies. "Skilled users with previous experience on time-sharing terminals can learn personal computing in a matter of days. On the other hand, executives often need a month of training just to learn basic keyboard skills and how to manipulate data."

Training costs also include the value of the time it takes the experts to learn enough to be considered qualified teachers. At Hilton International, which operates 91 hotels in 45 countries, director of information systems Robert Bennett recently assigned someone the task of learning about personal computers. "This person was DP oriented and he still spent a couple of months with Lotus 1-2-3 before he was capable enough to teach it to anyone," Bennett says. "That's an awfully large expense that has to be factored into the equation."

Technical infrastructure. Understanding the extent of infrastructure costs related to personal computer use means being acutely aware of the quality and physical realities of home and office electrical systems.

Individual users operating personal computers out of home offices are almost certain to need power surge protector boxes or even dedicated electrical lines. Small businesses and large corporations must be aware that personal computers aren't really stand-alone devices. A certain amount of construction to accommodate the installation of power cables and networking systems should be expected.

Additional hardware and software. As for the hidden costs of additional expenditures, these can only be controlled if users accurately assess the functional purposes of their computers. Many companies require personal computers to perform tasks for which there is no prewritten, off-the-shelf software. Hiring specialists to write customized programs is an expensive affair. Individual users must try to strike the proper balance between keeping system costs unrealistically low by buying too little equipment and letting computer expenditures get out of hand by buying every unnecessary gadget and gizmo in creation.

"Picking the right amount of hardware and software is like voodoo for users," explains New York consultant Flora Lazar. "People sometimes try to compensate for their lack of computer knowledge by overbuying. Others buy only the lowest-priced system without regard to the fact that they might really need certain devices and software to make their computer usable."

Service and maintenance. Successfully assessing the hidden costs of repairing and maintaining personal computers depends mainly on accepting the fact that systems will often break down because they are mechanically fragile. Users also should be aware that the personal computer manufacturers generally offer extremely limited warranties. That practice all but mandates the purchase of costly, long-term service contracts.

"With your house and your car, you get long warranties, but with personal computers, they've managed to make 90 days the standard period of protection," says Stephen Sankey, systems manager of end-user computing at Bank of America. "That's especially odd because many corporations are now buying personal computers in bulk and keeping them in a warehouse for a while. By the time they get the computers out of the box and onto their employees' desks, the warranties have already expired."

Ergonomics. Another major hidden cost that users must be ready to accept is the expense of ergonomics. Changing office furniture to accommodate the personal computer is a cost most users face almost as soon as they set up their printers and processors. Personal computer monitors and keyboards and traditional lighting, desks and chairs generally do not mix. Furnishings that work for executives using yellow legal pads and pencils rarely function well for personal computer users who spend their days punching commands into a keyboard and staring at video terminals.

Stephen Sankey, manager of end-user computing at Bank of America, estimates that employes require 45 days of training to efficiently handle rudimentary tasks on personal computers. Employees required to perform more complicated chores need about 75 days of training. "We're proud we get people trained so quickly," he says. "But even at that speed, training is an expensive process for the bank."

As personal computers continue to proliferate in corporations, so does the need for larger staffs of computer support specialists and training personnel. That reality adds even more costs to a company's training expenditures.

At Pacific Resources, Inc., the addition of 50 IBM and Compaq personal computers in two years has severely tested the data processing operation. "In-house training costs have been much higher than we expected," says Francis Natoli, the information services director. "We really thought our users would have been self-sufficient by now. That doesn't seem to be happening. Even experienced users want assistance on a continuing basis."

"The demand for personal computer training is also much larger than we had anticipated. That's raising our management costs, too," adds PRI's Vierck. "We have an arrangement with a local community college to provide training, but I think we're going to have to hire staff people to keep up with demand."

George Herbert, the general manager of data processing at Canadian Forest Products Ltd., Canada's largest lumber producer, faces a similar situation. About a year ago, when CFP purchased 30 Corona personal computers, Herbert assigned two people on his data processing staff to personal computer support. The two staffers, who have been traveling to the company's branches throughout Canada, are being overwhelmed.

"Most of our users are still working toward proficiency," says Herbert. "There's been some misunderstanding about the work needed to master a computer. The support people have been out in the field so much we're going to have to add more people at headquarters. The training is turning out to be extremely expensive, much more so than expected."

The training crunch even manifests itself at small companies which depend on skilled users to help less advanced novices.

As personal computers continue to proliferate in corporations, larger support and training staffs are needed.

At Arthur I. Weinstein, a New York City legal office specializing in real estate, Alan Freseman is spending more and more of his time supporting the company's three personal computers and less and less of his time working the company business. A financial director by title, Freseman has become the de facto personal computer support manager.

"Somebody had to act as the anchor and help the clerical people and the other professionals with their computer tasks," Freseman says. "I was the logical choice because I bought the computers and I'm the most advanced user. Now I spend a lot of my time solving computer problems. It's very expensive for a financial director to do that sort of work."

After the expense of direct and indirect training, the next largest hidden cost of personal computer usage involves installation of the technical infrastructure. The cost of providing data cables, electrical lines and other necessities is sometimes larger than the cost of the hardware and software connected to the wires. Jerry Burden, the manager of office automation systems at the New York Stock Exchange, provides a classic example of the almost completely hidden costs of computer infrastructure. By the time he brought the NYSE's virtually antique facilities up to modern technological speed, the bill was in excess of a half million dollars (see the story on page 103).

Infrastructure costs don't always involve major construction and wiring costs. At Canadian Forest Products, for example, many of the Corona computers were placed in pulp or kraft mills. Herbert knew the electrical systems in the mills were too unreliable for the delicate workings of the personal computers. His solution was to outfit each of the Coronas with a $400 power conditioner to handle electrical surges. At Weinstein, Freseman spent $300 to install a dedicated electrical line for his IBM Personal Computers.

Individuals who use personal computers at home face infrastructure costs, too. "Home electrical systems are flaky, totally unreliable for personal computer use," says consultant Dalton. "There are power surges in the lines all the time and that zaps data into oblivion. If users don't install private lines, then power surge boxes are essential."

Another hidden cost affecting both individual and corporate users is so-called "additional" hardware and software purchases. No matter what a user thinks—or may be told—the initial package of hardware and software he buys does not always turn out to be quite right. Often, hidden costs are incurred because the basic purchase simply did not include enough of the right equipment to make the computer system truly effective (see the story on page 100).

Corporations—as well as individuals—underbuy in the initial hardware/software purchase. Larry Carlson, a partner at Checkers, Simon & Rosner, a Chicago accounting firm, is "very positive" about his

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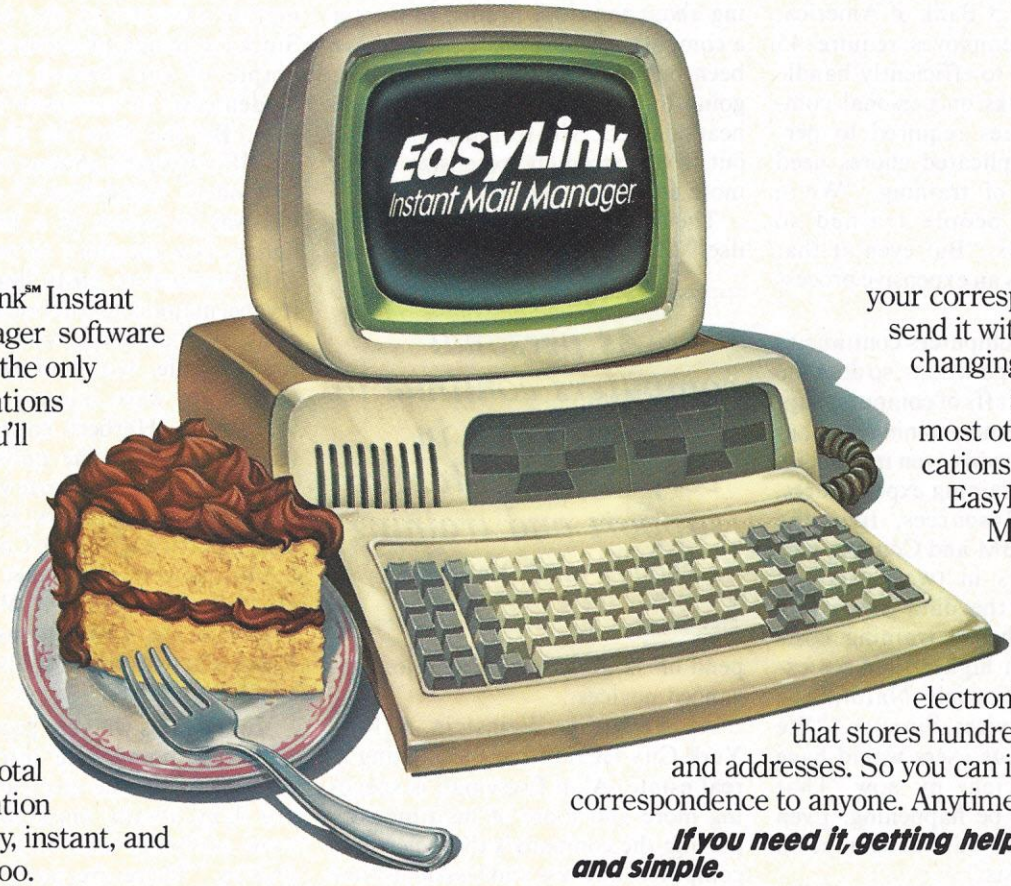

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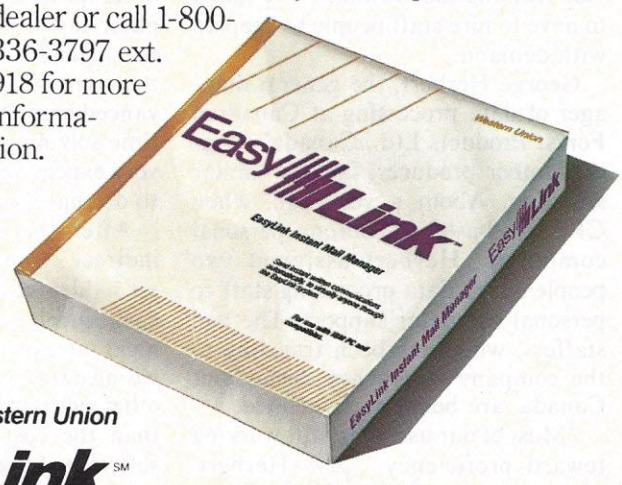

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CIRCLE 13

company's experience with its portable Columbia and IBM desktop computers. Still, he is amazed at the cost of needed peripherials. "The cable system that we needed to connect two IBM Personal Computers to one printer cost as much as the printer itself. That kind of stuff always shocks me."

Rick Pfening, the treasurer of Fred D. Pfening Co., an Ohio manufacturer of customized baking equipment, wishes his problems were as slight. His company bought an IBM Personal Computer to replace an obsolete NCR machine, but it needed a customized program to track factory-floor man-hours. Pfening hired a consultant to produce the software. Unfortunately, the consultant's program required nine hours to do what Pfening employees were doing manually in 20 minutes. That consultant was fired and replaced by a second, Tom Hamilton of Columbus Computing Company. Hamilton got the job done, but the total costs to the Pfening Co. have been stupendous.

"We originally thought we could get the system in place for about $5000," admits Pfening. "We're up to about $10,000 now, including our losses on the first consultant. And it's taken us more than nine months since we bought the computer to get to this point."

But underestimating costs is only one side of the coin. Many users, caught up in the glamour of personal computing, are guilty of overestimating their equipment and service needs.

"People are dazzled by the terminology, they're buying buzzwords," suggests Tom Trelford, a senior systems consultant on MicroStar, an IBM XT-based corporate cash management system marketed by Bank of America. "Novice users hear about things like 'data bases' and 'multiuser capability' and they want it. They claim they need it, but they don't even know what the terminology represents."

But the hidden expenses involved in servicing, maintaining and repairing personal computers are anything but frivolous. Personal computers are fragile devices; not only are they subject to costly breakdowns due to purely mechanical failure, they also need protection from extremes in certain environments.

Herbert at Canadian Forest Products learned that fact the hard way. The personal computers and floppy diskettes at the CFP's mills were repeatedly being damaged by dirt and dust. "The pulp mill is not a particularly healthy environment for a personal computer," he says.

Herbert's solution? Dust covers and static mats for all the personal computers. "And we've only belatedly realized that we've got to train people how to handle disks properly. Certainly, these were rather hidden costs we didn't initially foresee."

The relatively fragile nature of personal computers has led many users to buy service contracts for their ex-

COPING WITH COSTS LARGE AND SMALL

What does the New York Stock Exchange have in common with consultant Flora Lazar? Both had to overcome hidden costs for personal computers—both have.

Although the Stock Exchange's trading floor has been totally automated for years, the Big Board's executive offices were far behind the times. Several years ago, Jerry Burden, manager of office automation systems for the NYSE, proposed an executive automation plan built around Wangnet, the local area network which allows the integration of everything from word processors to personal computers. Burden's plan called for more than $100,000 worth of hardware and software expenditures. It was quickly approved. That's when the reality of implementing an office automation program set in.

"All of the Exchange offices are in old buildings" in New York's crowded Wall Street district, Burden says. "They weren't built to accommodate lots of cables and wires running through the floors, the closets and the walls. Our buildings just didn't have the kind of cabling space that is built into new buildings."

To facilitate installation of the Wangnet cable throughout the New York Exchange's buildings, Burden eventually had to spend more than $500,000. "The component cable of Wangnet only cost about $20,000," he says. "The rest of the money went to architects, construction workers and contractors. Every time we wanted to put in cable, we had to rip up parts of the building and draw up new plans and pay for new construction."

Flora Lazar faced a proportionally smaller, but no less serious problem. Currently, she runs a consulting firm for small businesses and software houses. When she bought her first personal computer—an Apple II Plus in 1980—she was little more than a victim of additional hardware and software purchases for her computer.

"I was seduced," Lazar recalls. "Basically, I bought my first Apple because it was offered to me at a 30 percent discount. I considered it a great bargain and treated it as a Christmas present. I've been paying for that bargain ever since." But Lazar says she made a classic personal computing mistake. "I bought the Apple totally stripped. There was no software whatsoever, not even word processing. It sat around my house for almost a year without being used because it couldn't do anything."

Lazar eventually got to use her computer, but only at substantial additional cost. By the end of 1982, her stripped-down Apple had to be augmented by an additional disk drive, an array of software packages, a CP/M board, an 80-column monitor board, a telecommunications modem and a passel of extra cables, equipment and services. Total additional cost? "At least $2500 and that's a conservative estimate," she says.

pensive equipment. That creates another hidden cost many personal computer users never expected.

"After you use computers for a while, you get the feeling you're sitting on a financial time bomb," says Freseman of Weinstein. "You're afraid you're going to get socked with a murderous repair bill at any moment, so you buy a service contract. We're paying $65 a month for parts and labor coverage for our Qume printer and $150 a month for parts and labor coverage on our IBMs. Now I wonder what's worse: gambling on the big repair bill or paying out for overpriced service contracts month after month after month."

Sheryl Fragin doesn't have to wonder which cost is worse. The New York City-based magazine writer has already been socked by both costs. The monitor on her IBM Personal Computer broke down just weeks after its 90-day warranty expired. She was forced to buy a replacement monitor for $395. Then, to guard against another major repair bill in the future, she signed a service contract which will cost several hundred dollars annually.

"You feel like a captive. Getting repairs made is very threatening," she says. "The repair people make it very clear that they are controlling your future, so you get a service contract, no matter how expensive, as a simple act of self-defense."

But the hidden costs of personal computers are not restricted to the machines themselves. Individual and corporate users alike run up thousands of dollars of unexpected costs buying new furniture that is ergonomically compatible with the vagaries of computer keyboards and monitors.

"There's no way that traditional office desks and chairs work with personal computers," says Pironti of Schering-Plough. "You may doubt that an inch here or there on the height of a desk makes that much difference, but once you work on computers, you know you have to design your office around it. Just about every new computer order we fill these days

THE CONTINUING COSTS OF PERSONAL COMPUTING

It's easy to overlook how many floppy disks, printer ribbons or software packages you use in the office today. But the total annual cost for those and other items is not as easy to ignore.

The most expensive, but necessary, continuing costs are for the purchase of additional software and the hours spent learning to use the software, says Nick Spiridellis, president of the CompED Learning Center, a New York City firm which provides training and consultation to companies purchasing personal computers.

Roger Bender, microcomputer coordinator at Citibank in Manhattan, agrees with Spiridellis but feels companies sometimes look to cut corners on the purchase of software. Frequently, he says, a company will "spend $7000 on a computer system without batting an eyelash yet agonize over a $400 package of software."

In other cases, it is not a matter of buying too little software but of buying the wrong software, says Joel Blank, CompED's vice-president. He says that a company will routinely buy an executive a word processing package when "you know he'll never even type a memo." As a result, a package costing several hundred dollars sits in a disk holder.

How much software is the right amount varies with the user. A financial planner who also writes reports might need two spreadsheet programs, a separate data base and a word processing package. A secretary usually needs only a basic word processing program—if that. Tom Violette, program manager of Control Data's Homework Program, estimates that Control Data employees working with a computer use no more than two packages ranging in price from $300 to $600 for each package per year. Metropolitan Life estimates it spends $1000 per year per user on software packages.

Once the software is purchased, a company must count on the cost, both in time and money, that must be spent in training employees to use the software. At Citibank, Bender offers in-house classes for personal computer users. Users doing more sophisticated applications attend outside classes at centers such as CompED. Employees using personal computers at Control Data generally go through 40 hours of training per year and programmers at Control Data put in closer to 80 hours of training. A typical 40-hour one week training seminar given by Control Data will cost as much as $1300 per person.

Although Spiridellis of CompED says supplies are a "negligible factor," the cost for these can mount with frequent use of the computer. At Metropolitan Life, a "typical" employee working regularly with a computer uses about 10 boxes of paper costing $350, 15 printer ribbons costing $225 and 100 disks costing $550 over the course of a year. While the list prices the insurance carrier used in estimating costs are higher than Met Life or another company probably pay for supplies, they are an accurate ballpark figure.

Don't forget charges for periodic maintenance of the computer and peripherals. Metropolitan Life pays an average monthly maintenance charge of $55 for an IBM XT and $15 per month for an Epson FX-100 printer.

How much will you spend on electricity? Violette of Control Data estimates that operating a terminal, printer and one other peripheral costs "a little more than having a television running eight hours a day." A modem adds to both electrical and phone bills.

According to Blank of CompED, 90 percent of the people who buy a personal computer have the wrong perception of what they will use it for. One potential way to keep operating costs in line would be to do all that is possible to be among the remaining, more thoughtful, 10 percent of personal computer owners.

—Patrick Honan

also comes with an order for new furniture of one type or another."

Tony Niskanen's furniture problems, however, were less ergonomic and more stylistic. A marketing manager for International Paper Company, the huge forest products concern, Niskanen owns two computers. But there was only one place he could set up his computers in his New York apartment: the foyer.

"I've had no psychic problem putting my computers in full view in the foyer," Niskanen explains. "It's just that the foyer is the first thing you see when you enter the apartment. So you can't just throw the computers on cardboard crates. You've got to do something to make them blend in with the rest of the apartment."

Blending the computers into the apartment has cost Niskanen $1200 for a leather and chrome writing desk and matching chair and $300 for a black work table for the computers. There was also $75 for a combination magnifying glass and light; $75 for a swing-armed typing stand; $350 for a specially designed overhead light; a printer stand; and a bookshelf.

The purchase of new desks and other furnishings for personal computer systems points out still another hidden cost: the expense of the extra space the user needs to accommodate the personal computer and its attendant array of new furniture.

"Buying a personal computer means a user will probably have to double the amount of space he's allocated for his work area," says Dalton, the consultant. "It's a really basic equation, so basic that people forget it. You need to put the computer on something. You probably don't have room to put it on the desk you're already using, so you go out and buy a new desk. That new desk has to be placed somewhere. So, suddenly, you own two desks and your need for work space is doubled. Office space rentals being what they are, doubling employees' work spaces gets to be a very expensive hidden expense."

The hidden cost of extra work space affects individual users as well as corporate users. If you're Kenneth Brown, an architect and one of Honolulu's most prominent business executives, you redesign a guest room in a small cottage on the grounds of your Diamond Head home. If you're Fragin, the New York City-based writer, you commandeer your dining room table and put it to use as an auxiliary desk.

"I got so used to using my IBM Personal Computer in the office that I felt I needed one at home," Brown says. "But I didn't have enough work space anywhere in the house. So I remodeled a room in a little building we have out back. I put in an L-shaped desk, special lighting and some bookshelves and turned the room into a computer center. I didn't do it too scientifically. I pity the guest who has to sleep with my computer."

"I used to be one of those lucky New Yorkers who had a second bedroom I could use as an office," says Fragin. "Then the computer moved in. From the moment it was set up, I knew the office wasn't big enough for the both of us. So I moved my telephone and my Rolodex and my notebooks onto the dining room table. Now I only use my office when I'm writing on the computer."

While hidden training costs, infrastructure and maintenance expenditures and the cost of new furnishings and additional hardware and software are as old as personal computers themselves, a new type of hidden cost is beginning to appear. As faster, better and more productive personal computers and software reach users, individuals and corporations are phasing out older machines and outdated programs. Users must now confront the reality that cashing in on the productivity of personal computers often means cashing in a certain amount of obsolete equipment.

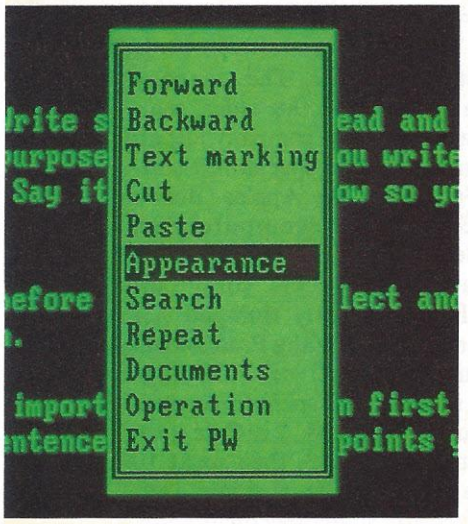
Arthur I. Weinstein, the real estate firm, used three Apple computers before converting to IBM Personal Computers last year. The company eventually bartered the older computers away, but the company lost all of its investment in specialized software written for the Apples. Brown donated his first computer, an Osborne 1, to the Pacific Game Fish Foundation. New York consultant Flora Lazar recently dumped her Apple in favor of a Wang Professional Computer. Pironti of Schering-Plough says his staff spent three man-days converting 108 VisiCalc programs to Lotus 1-2-3, then spent 10 man-days converting a single antiquated data base management package to dBase II.

"We also have some Radio Shack computers that are obsolete now that we've standardized around the IBMs," Pironti adds. "We've haven't decided what to do with the old machines. We might donate them or maybe raffle them off to employees. The Radio Shacks did their jobs when they were purchased, but they're useless to us now. It's an obsolescence cost that is simply unavoidable."

No one knows more about the hidden cost of personal computer obsolescence than Brophy, the senior vice-president of data processing at The Travelers Companies, a major insurance and financial services firm. In three years, Travelers has purchased 8000 IBM Personal Computers and is buying new units at the rate of 3000 annually. But before the company started buying IBMs, more than 500 Apples had been purchased.

"Most of the Apples are coming back from our employees now," says Brophy. "We generally donate them to schools. It's costly when you have to write off that many machines, but it's part of the overhead. In a business like ours, which is so dependent on automation, you can't afford to fret about the cost of obsolescence. The technology is moving so fast that if you worry about writing off the cost of a few out-of-date machines, chances are you'll miss the next great advance in office productivity."

If a word processing these 8 tools for better



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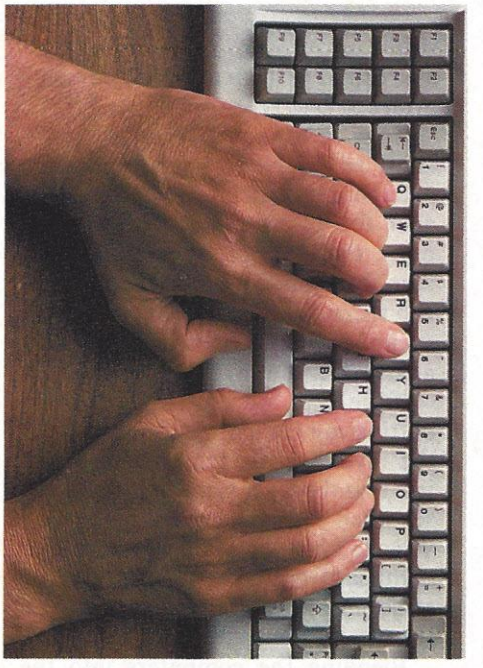

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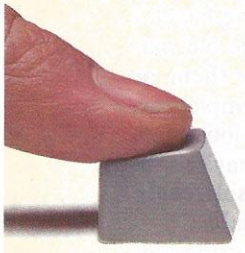

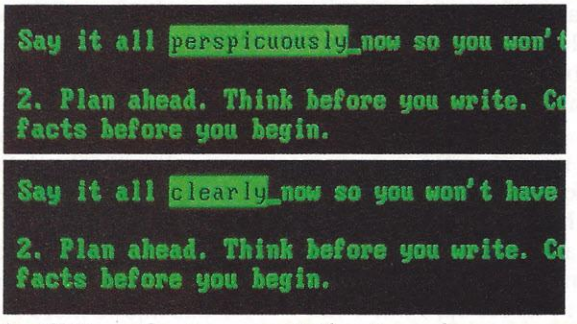

3 Powerful editing features at the touch of a single key.

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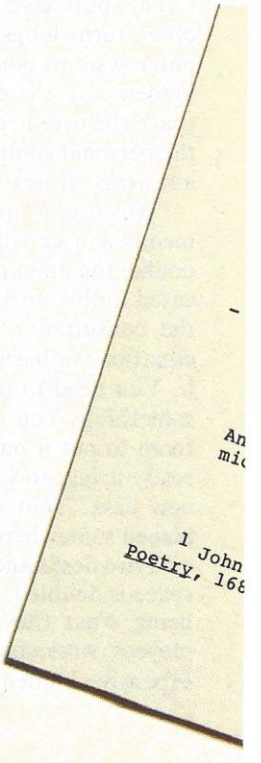
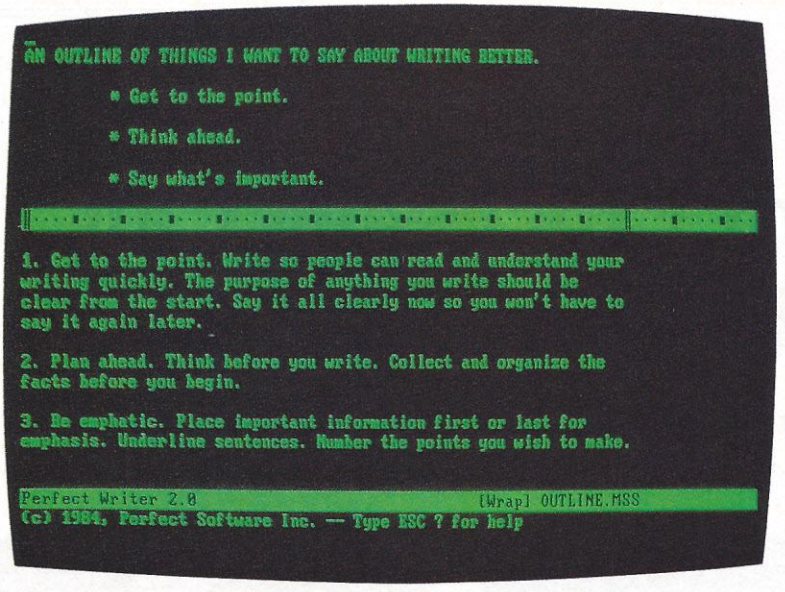
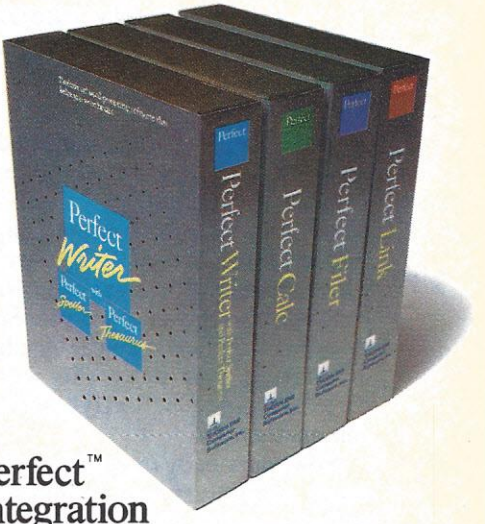


program doesn't give you writing, it's not Perfect.™



6 Split-screen windows that help keep your thoughts organized–while you write.

It's like having a notepad right on your screen. You can use one window to jot down notes, key points or an outline—as you develop your text in the other window. See? With Perfect Writer, you can really compose your prose.



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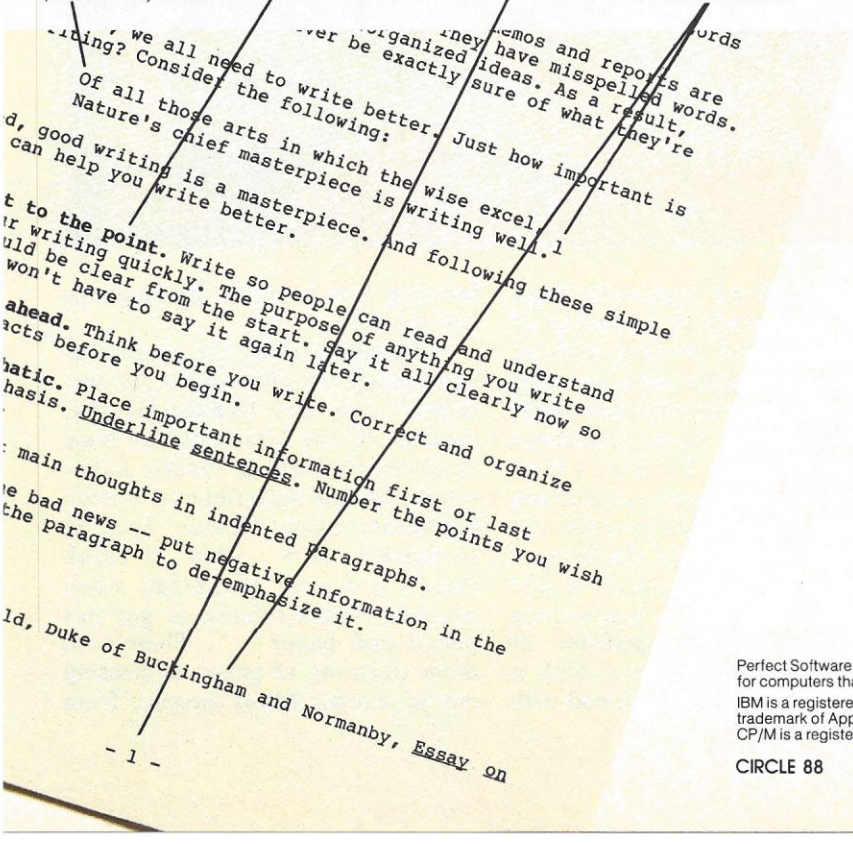

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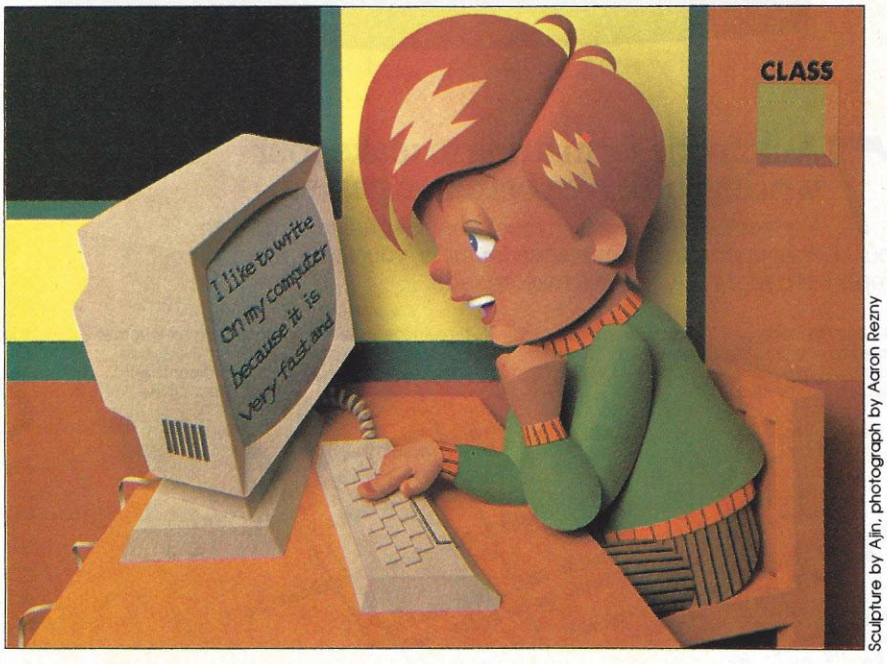
CIRCLE 88

How Word Processing Can Help Your Kids

By encouraging kids to write more, word processing software may help them to become better writers

In the past few years, thousands of personal computer users have discovered the benefits of word processing. Everyone from managers who do their own reports to writers who have traded in their typewriters have come to rely on word processing to reduce the mechanical drudgery of writing and pave the way to clearer, more effective written communication.

Now, the steady integration of personal computers into schools and homes is putting these benefits at the disposal of a different segment of the population: children. In fact, parents may some day regale their offspring with tales of the hardships of writing with pen and paper, just as their grandparents may have stressed the marvels of modern methods compared with the slate pencils or steel pens with which they scratched out their first exercises.



Sculpture by Ajin, photograph by Aaron Rezny

Word processing offers kids the same benefits of easy revision and sleek presentation that make it so attractive to adult users. But it also provides some other, more subtle advantages that can be vital in forming a solid foundation for good writing skills.

Breaking down barriers

One of the prime advantages of word processors over traditional pen and paper is their ability to break down the physical barriers of getting words onto paper. Word processors break up the traditional relationship of handwriting and writing and let children concentrate more on what they're writing rather than how it will appear. Antonia Stone, executive director of Playing To Win, a New York-based computer consulting firm that works with juvenile ex-offenders says, "One of the things I believe has turned people off is that writing has been tied to handwriting in schools. I am supportive of legible writing, but I don't think it should necessarily be combined with learning how to write the language you speak."

"Computers offer the marvelous opportunity for children to get text down," says Dr. Donald Graves, director of the University of New Hampshire's Writing Process Laboratory. Maude Ackerman of Entech Computer Skills Center, Inc., in Commack, N.Y., adds, "I think there's a barrier that's lost when someone doesn't have to get out pencil and paper .... There's no more smearing of paper or crossing out of words. Many people, from

school children on up, are far more creative and fluent when they're in front of a computer."

Once that text is down, the word processor's editing capabilities come into play, providing children with a way to change and refine their work until they're satisfied with it. With a computer, changing a word no longer means recopying a sentence or an entire draft. "The big thing is the chance to go back and fine-tune language," says Graves. "I don't have hard data yet, but the thing you do see is that kids really can afford to see manipulation [of words] as clay-like. A teacher can say,'Why don't you insert that?', and it's kind of fun to see the machine actually insert the copy."

This ease of revision can encourage kids to think more creatively and to consider alternate ways of expressing themselves instead of contenting themselves with the first or the best-looking draft of their work.

Finally, a word processing package can provide a clear and readable presentation of a child's work. Whether on the screen or on a paper printout, text generated by a word processor has a decidedly "grown-up" appearance that can have the psychological effect of dignifying work and making a child proud of what he has accomplished. And because the final product will always look presentable, the child can devote more time to the content of his work and less to the actual physical presentation.

The overall result can be a less restrictive, more creative environment in which to learn and improve writing skills. Word processing can strip away the mechanical causes of the writing stage fright which kids (and adults, too) experience when confronted with a blank page. Says Mari Endreweit, one of the developers of Bank Street Writer, "One of the informal reports we get is that children write more. That's particularly noticeable in children who were poor writers before. They want to write on a word processor; they're tickled by the opportunity. The ease with which they can make corrections appears to free them up to write more."

With the variety of software available, there's no reason why kids can't start using a word processor from a very early age.

Adelaide Palmer, a language arts supervisor for the Bloomfield (N.J.) Public Schools has been observing the progress of sixth graders using word processing. In comparing the performance of students who learned word processing and those who didn't, she remarks, "The teacher's subjective feeling is that kids tend to write more on a processor. Teachers also see good carry-over when the [experienced] students are writing without a word processor: They have a feeling of a *transfer* of revision skills."

A marked improvement

Teachers aren't the only ones who are noting the benefits of word processing for young users. Joel Ackerman, the 14-year-old son of Entech's Philip and Maude Ackerman, reports a marked improvement in his writing since he began using a word processing package. "First of all, my handwriting is very sloppy," he says. "If I made a report, nobody could read my handwriting. And if I made a couple of errors, then I'd have to rewrite the whole report." But with the computer, he says, "everybody can read my work ... and I write more—definitely. It's quicker than writing by hand. With the hand, by the time you finish a sentence, you forget what you were thinking of."

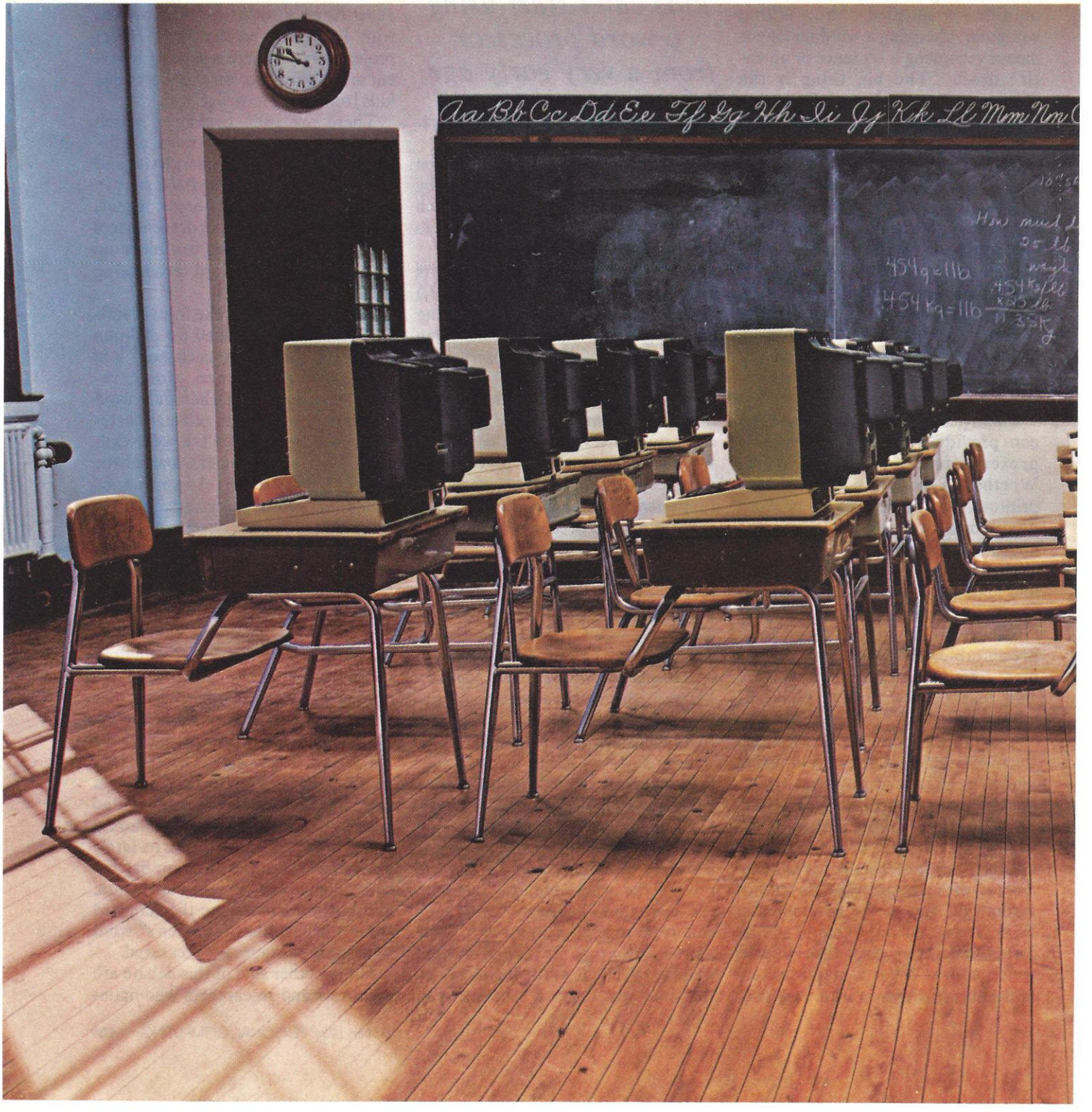
With the variety of software available, there's no reason why kids can't start using a word processor from a very early age. Most kids don't begin "serious" word processing in schools until the third or fourth grade, but Janet Kane, a researcher who worked with Endreweit on the Bank Street project, says, "There's nothing inherent in the word processor that prevents kids from doing it earlier."

There are even packages, which while not true word processors, are designed to teach preschoolers letter and word recognition, skills which start in motion the writing process. Later, when they begin to construct sentences and full thoughts, kids can move up to a full-fledged word processing package.

Whether this takes the form of software specially developed for children or one of the "adult packages" is a matter of preference. Some researchers argue that the adult word processors, with their orientation toward business use, aren't suited to children. That argument has formed the basis for the development of "children" word processors, notably Bank Street Writer, developed by the Bank Street College of Education in New York City. Researchers monitored the experiences of children with such adult packages as Apple Writer and found that many involved commands that were difficult for children to remember. "We discovered we needed to design a word processor that was simple to use, with clear instructions on screen and transparent for the kids," says Endreweit. The resulting package, Bank Street Writer, features a simplified 40-column format, limited commands and some basic formatting and printing functions. Since its introduction in 1982, the program has become popular in schools and homes, and has in fact become the standard against which other "children's" word processing packages are measured.

On the other side of this debate are educators and researchers who main-

THEY DON'T MAKE CLASSROOMS LIKE THEY USED TO.



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CIRCLE 38

tain that the adult packages are fine for children. Stone, the computer consultant, is one supporter of this view. "Children have the capacity to learn to use word processors that teachers sometimes wouldn't credit them with."

The result of these differing opinions is that the market now offers both types of packages, which can make selection harder for parents and teachers. It may be a question of buying a package with "training wheels" as against a more sophisticated program which the child will grow into. But even in the adult packages, there's a trend toward ease of use and simplified instructions that may make the need for specialized, scaled-down word processors obsolete. And a full-fledged word processor with a solid and accessible core of basic functions could serve a child throughout his school years. He could simply begin with the core functions, calling on the more advanced features (formatting, footnoting) as he needed them.

Although it's an interesting debate which will have implications on future software development, it's an argument that can be circumvented by evaluating programs on an individual basis, with priority given to choosing the package best suited to a child's age level and particular needs.

A full-fledged word processor with a solid core of basic functions could serve a child throughout his school years.

Can word processing help kids to become better writers? Though the majority of findings regarding children and word processors have so far been positive, it's important to remember that a word processing program is just that: software that *processes* words. As Bank Street College's Endreweit puts it, "The word processor per se isn't going to teach kids to be better writers. It's just a tool. It turns the computer into an efficient writing tool. Children still need to be helped, taught and supported to become writers; that depends on the skill of the teachers and the ability to help the children."

The University of New Hampshire's Graves adds the caution that the sleek appearance of documents may camouflage mediocre work. "Sometimes it looks better than it is," he says. "The copy is all justified; it's so crisp. It's a little seductive that way."

Still, the possibilities are exciting. Says Marlene Scardamalia, a psychologist at the Ontario Institute for Studies in Education in Toronto, "From my point of view, there's a very high correlation between the quality and quantity of writing in students. . . . Computers are more motivating things to write on and therefore kids are writing more." Any tool which can encourage kids to write *more* is well worth looking at. Writing requires discipline and practice, and writing skill grows with use. By providing children with an accessible way to express themselves, word processing may in fact make better writers of our kids.

—Nora Georgas

SOFTWARE FOR CREATIVE KIDS

In addition to word processing software, programs are now becoming available which help children develop and reinforce specific writing and editing skills. One such program is Quill, a package of software modules developed by Bolt Beranek and Newman, Inc., of Cambridge, Mass., and marketed by DCH Educational Software.

Quill's modules include a program which teaches kids to organize cardfiles, a mini-electronic mail system called MailBag and a planning/notetaking module. According to Andee Rubin, one of the program's developers, the idea behind Quill was to incorporate elements of the process approach to writing—the theory of writing which identifies a number of stages a writer goes through in developing his ideas. "We incorporate environments that reinforce better planning and better communication," says Rubin.

Quill works with The Writer's Assistant, a word processing package from InterLearn, Inc. James Levin, the developer of The Writer's Assistant, calls the Quill modules "tools for brainstorming, for generating ideas."

Interlearn has also developed its own writing support programs including: Poetry Prompter, an interactive tool for writing various forms of poetry; Computer Chronicles Newswire, a software template for putting together an electronic newsletter; and The Adventures of Horus, an interactive story creation package. "The packages provide dynamic support for writing different types of text: newspaper articles, expository text, poetry and business letters," says Levin.

Story creation programs, while independent of word processing packages, may offer some help in developing writing skills by letting kids write their own stories. These programs include Story Tree from Scholastic, Story Machine from Spinnaker and two separate (and unrelated) Story Maker packages, one from On-Line Software and the other from Bolt Beranek and Newman. But Rubin cautions that the quality of these programs varies widely. "This whole thing is in a very early stage of development," she says. Whereas some programs offer branching menus and questions, presenting kids with a broad range of options, others have limited vocabularies and choices for story construction.

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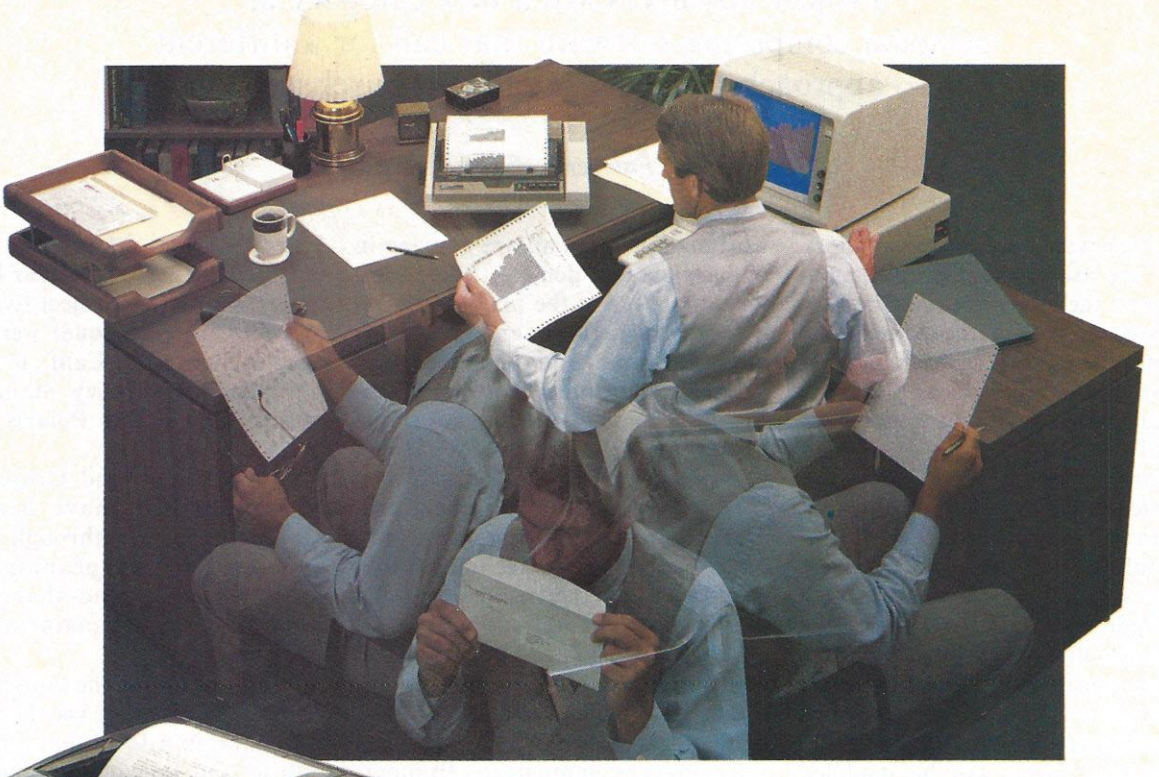

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CIRCLE 7

Choosing Project Management Software

Project managers are a new category of personal computing software that call for a different approach from the intelligent purchaser

by James E. Fawcette, Executive Editor

Whenever software vendors are asked about project management, their eyes gleam. They see this area as having the potential to become "the next spreadsheet," a major new genre of application programs that will have widespread appeal.

Project management software embraces a basic function central to virtually every manager's job: scheduling and planning projects. This new category of software aids the manager by helping to visualize schedules. Virtually any project, from a giant construction job in a remote locale to the writing and production of instructional brochures on a departmental level, can be modeled easily and quickly using a personal computer.

Many managers who are interested in getting involved in personal computing still have difficulty answering the basic question, "What will it do for me?" Word processing is the most widespread application, but many managers do little of that. Spreadsheets are excellent tools for numbers-oriented managers and have tremendously improved the productivity and planning capability of companies from the largest conglomerate to the classic entrepreneur in a garage. Yet the majority of managers are not heavily involved in juggling figures. Similarly, creation of business graphics, communication and data base manipulation all are growing in importance, but don't yet fit the immediate needs of the majority.

Yet virtually every manager manages time and people. Here, project management software promises to become a primary answer to management's question: "What can personal computing do for me?"

A good project management program is one that allows a manager to quickly and easily enter information on a project and then see the following graphically or in tables: when various portions of the job will be completed; which resources are being used on different tasks; and, most importantly, potential problems. It can also help the manager communicate. Printouts along with memoranda can show the status of projects to superiors or be used to create presentation graphics.

And, like spreadsheets, project management software can be used as a what-if tool to project the impact of delays or revisions, or to try out plans on-screen before implementing them. For instance, a manager could determine how much overtime will be necessary to bring a project in on schedule if one stage slips by a week.

What is project management?

Project management is hardly a new concept. One of the basic graphic representations, the timeline or Gantt chart, dates back to 1912 with publication of *The Bar Chart*, a book by Harry Gantt. Milestone charts emerged during World War II, while PERT charts (for Project Evaluation and Review Technique) were developed in Sunnyvale, Calif., to help the United States Navy manage the multibillion dollar Polaris missile project.

PERT, Gantt and Critical Path Method (CPM) have been used for decades, first through manual calculations and graphing, then later through time-sharing systems resident on mainframe and minicomputers.

What is new is the subset of this power now available via the personal computer, in a form that, unlike the obtuse and convoluted mainframe software used by professional project planners, is extremely easy to learn and easy to use. And since this category is new and could well bring use of a computer for project management to thousands of people who never considered this approach before, selecting a software package is considerably different than shopping for conventional word processors, spreadsheets and data base programs.

Programs such as Time Line from Break Through, Harvard Project Manager from Harvard Software, Microsoft Project from Microsoft, and MacProject from Apple Computer each have a decidedly different approach to solving the same problem—helping managers sched-

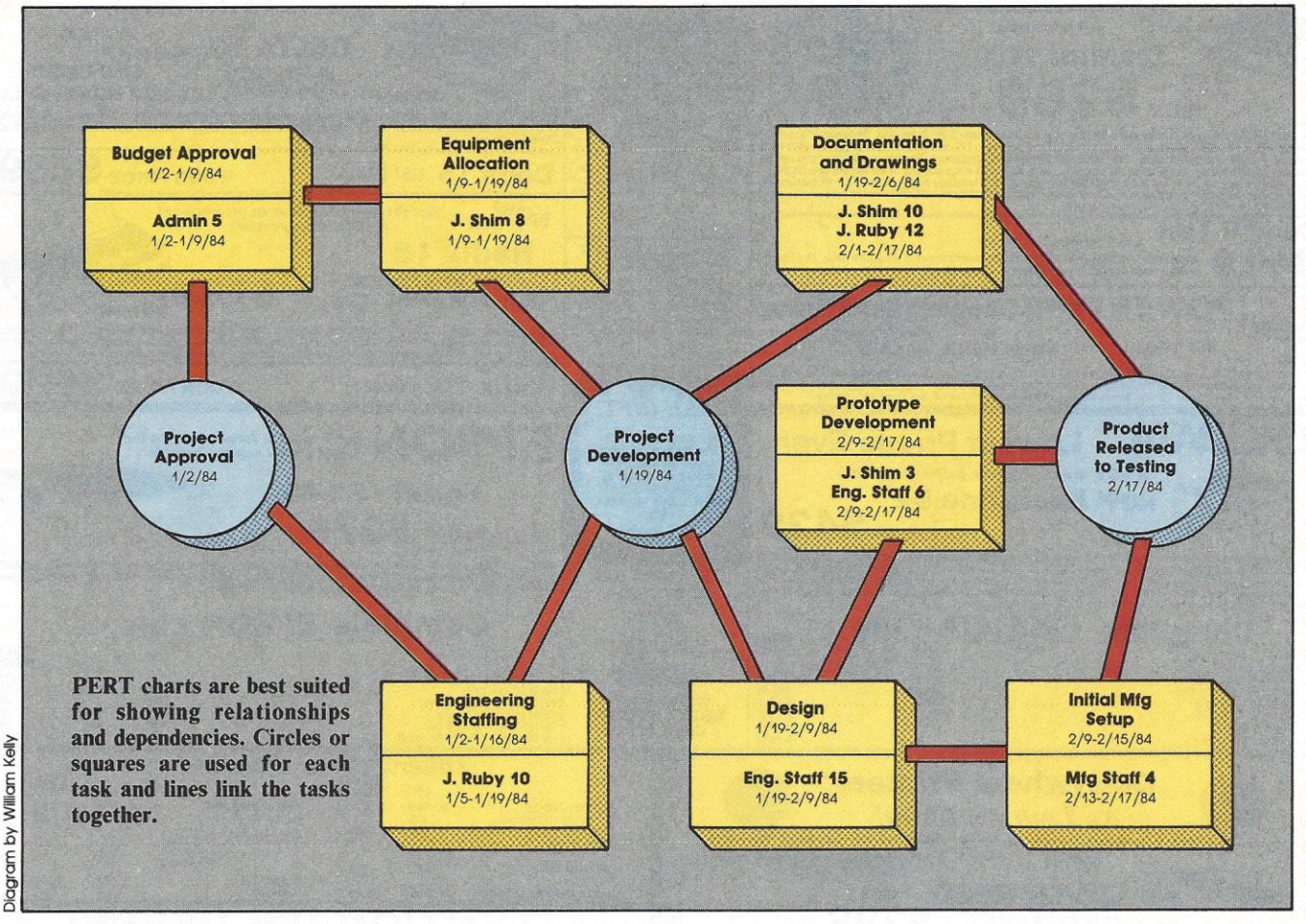

Diagram by William Kelly

ule projects—but each is easy and effective.

The basic concept of relating tasks to resources is present throughout the range of available software. Each project is broken down into tasks. In printing a product brochure, the tasks might be: creating the copy, getting production quotes, designing the pamphlet, getting price quotes, having type set, layout and pasteup, and printing . . . or a dozen other intermediate stages. Each of these tasks is associated with the resources needed to accomplish the task. Resources might be people such as writers or artists, or it might be physical tools, such as a typesetting machine. Management reduced to its simplest form is making sure that the typesetter doesn't sit idle for days, then find itself with the impossible task of producing several documents simultaneously.

When descriptions of tasks and resources are entered into project management software, the program creates graphs that represent the flow of work. This is perhaps the main difference between project management and other categories of software; the graph is the principal method of interaction with the program. (Although integrated software allows numbers to be graphically represented, this is done after the fact as a means to present numbers created and manipulated within a spreadsheet or data base.) Graphs are central to entering, reading, analyzing and altering project scheduling data.

Of the several varieties of graphs, Gantt-type bar charts, or timelines, are the most common. In a Gantt chart, the horizontal axis represents time while tasks are listed along the left side of the screen. Horizontal bars start at dates representing the beginnings of tasks and end when each is due to be completed. If a task depends on another earlier task, its bar can be linked through the software so that delaying the earlier task also moves the bar for the second tasks' bar to later start and finish dates.

PERT charts, the other primary type, are best suited for showing relationships or dependencies. Symbols such as circles or squares are used for each task and lines link the tasks together. If a task cannot be accomplished until several earlier tasks are finished, each of those tasks is linked

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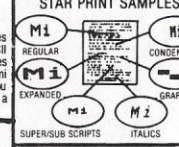

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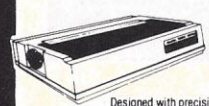

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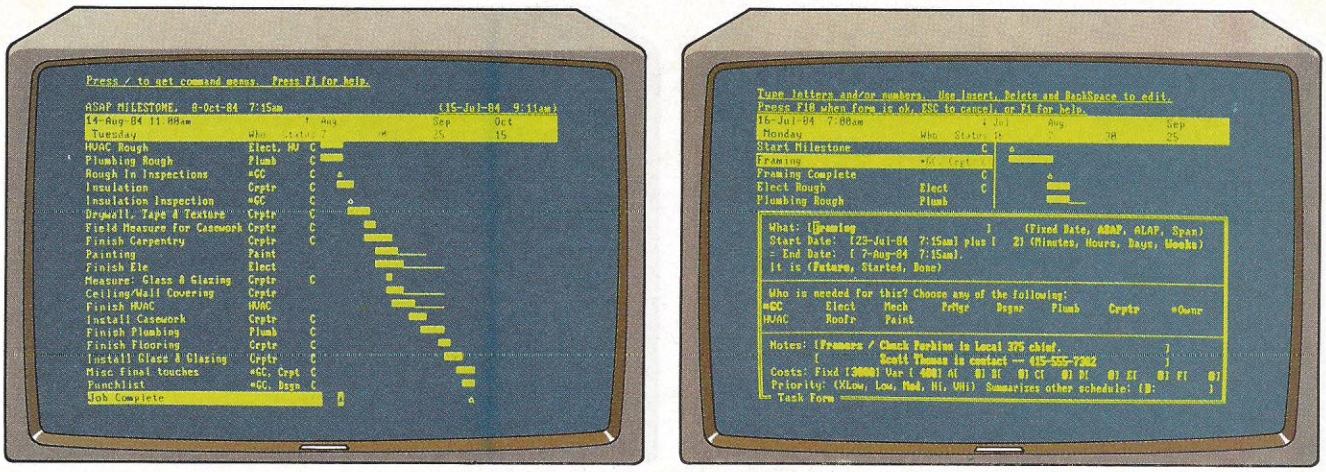


With resource scheduling (left), Time Line automatically resolves all conflicts so people are scheduled for one task at a time. Details for each task are entered on a fill in the blanks form (right). Entry is straightforward, multiple choice wherever possible.

by a line. Other chart types include milestone and activities-on-arrow networks.

Graphics central to selection

The graphics display must therefore be the first point in deciding which program best suits any purchaser's needs. Here there is considerable disagreement between experienced users and considerable room for subjective interpretation.

Some packages include only one graph type. Microsoft Project, for example, features the Gantt chart, although future releases will also incorporate PERT charts. The rationale is that Gantt charts provide clearer presentations of the time required for different tasks, while PERT charts can not realistically represent time. PERT charts are excellent for visually depicting the dependent relationships between tasks and for showing critical paths, yet the lines between task symbols can not be effectively scaled to show the duration of each. "PERT charts may be the most pleasing to look at in a computer store, but Gantt charts convey more information," according to Microsoft's Rob Glaser.

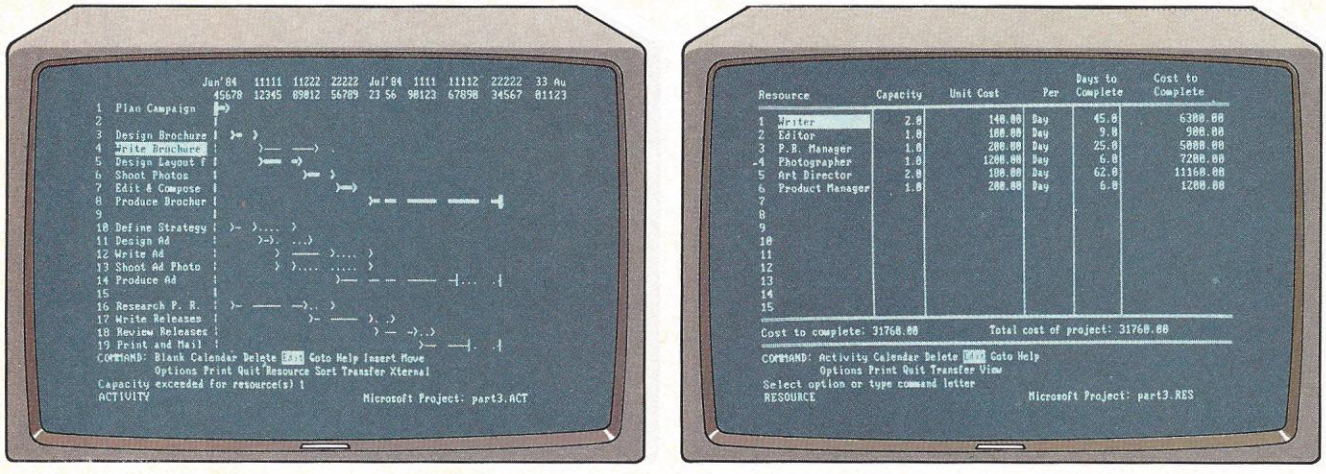
Others strongly disagree. "Gantt charts are not a disciplined approach," says Jim Halcomb, owner of Halcomb Associates in Sunnyvale, Calif., and a top planning consultant. "Gantt charts don't force you to organize projects. To be creative, accurate and thorough you must use PERT."

In classical project management, with a staff of full-time planners grinding away at a project the size of the Alaska pipeline, PERT is generally used for scheduling projects with a high degree of uncertainty about the time needed for each step. The critical path method requires more information and thus PERT charting is a subset of CPM, in that world project management. Yet as project management moves to personal computers, those old boundaries are rapidly becoming blurred.

LisaProject is one package that relies heavily on the PERT approach, but can be effectively used to analyze delays and schedule slippage because extensive labels can be placed on each task symbol and further information can be called up quickly by clicking Lisa's mouse, the cursor control device Apple hopes to make ubiquitous. LisaProject has been enhanced in the recent release of Lisa office software, dubbed Lisa 7/7, so that data can be readily exchanged with other applications packages.

Harvard Project Manager for the IBM Personal Computer not only supports both PERT and Gantt charts (although Harvard calls them roadmaps and schedules) but can display both simultaneously.

Another important graphics consideration is the ability to read the information on the computer screen. This may seem obvious, yet it is easy to overlook. A PERT chart that looks adequate when demonstrated in a computer store using a full-size monitor may shrink to illegibility on a portable computer with a 9″ or 7″ screen. Some programs limit the amount of information that can be placed next to task symbols, leaving the user with cryptic abbreviations. Simple clarity of image relies both on the software and hardware. The mere shape and types of symbols or lines influence legibility, as does screen resolution. Here, computers with bit-mapped graphics, such as the Apple Macintosh and Lisa or any number of bit-mapped MS-DOS machines due to debut in the next year, have a decided advantage over conventional character-based screen displays used by the IBM Personal Computer and Apple II series. One new product that takes advantage of this resolution is MacProject from Apple Computer. This program for the Macintosh personal computer can show different levels (primary and secondary) of critical



The message on the bottom (left) "Capacity exceeded . . . ", is Project's way of informing the user that a writer isn't available. On Project's Resource Table (right), the Capacity column displays how many of each resource are available for the project.

project paths on a PERT chart.

Purchasing software can frequently degenerate into a misleading numbers game if the buyer does not keep in mind realistic needs. In project management, the parameters are numbers of tasks and resources that can be handled. According to Halcomb, "Mainframe software can handle 10,000 activities or more, which is more than anyone can digest." Harvard Project Manager, MacProject and Microsoft Project can handle around 200 tasks. For projects beyond that the user can break the project down into subtasks and link them much like linking spreadsheets.

Still, this may not be enough for some heavy users. Here a program such as Westminster's PERTmaster may be the answer. PERTmaster can handle up to 1500 activities and still sort them quickly.

Sheer numbers alone can be misleading. One trick is to look for how many resources and how much information can be stored with each task or activity.

Ease of use

There is a direct trade-off between the number of activities that can be handled and speed, as well as ease of use. There are also enough different approaches to the user interface, or the way in which commands are given and prompted, that everyone should be able to find a product that fits his or her tastes.

Anyone who uses spreadsheets should be comfortable with either Time Line or Microsoft Project. Both model their commands after spreadsheets; Time Line is loosely patterned after Lotus 1-2-3 while every Microplan user will recognize the commands of Project.

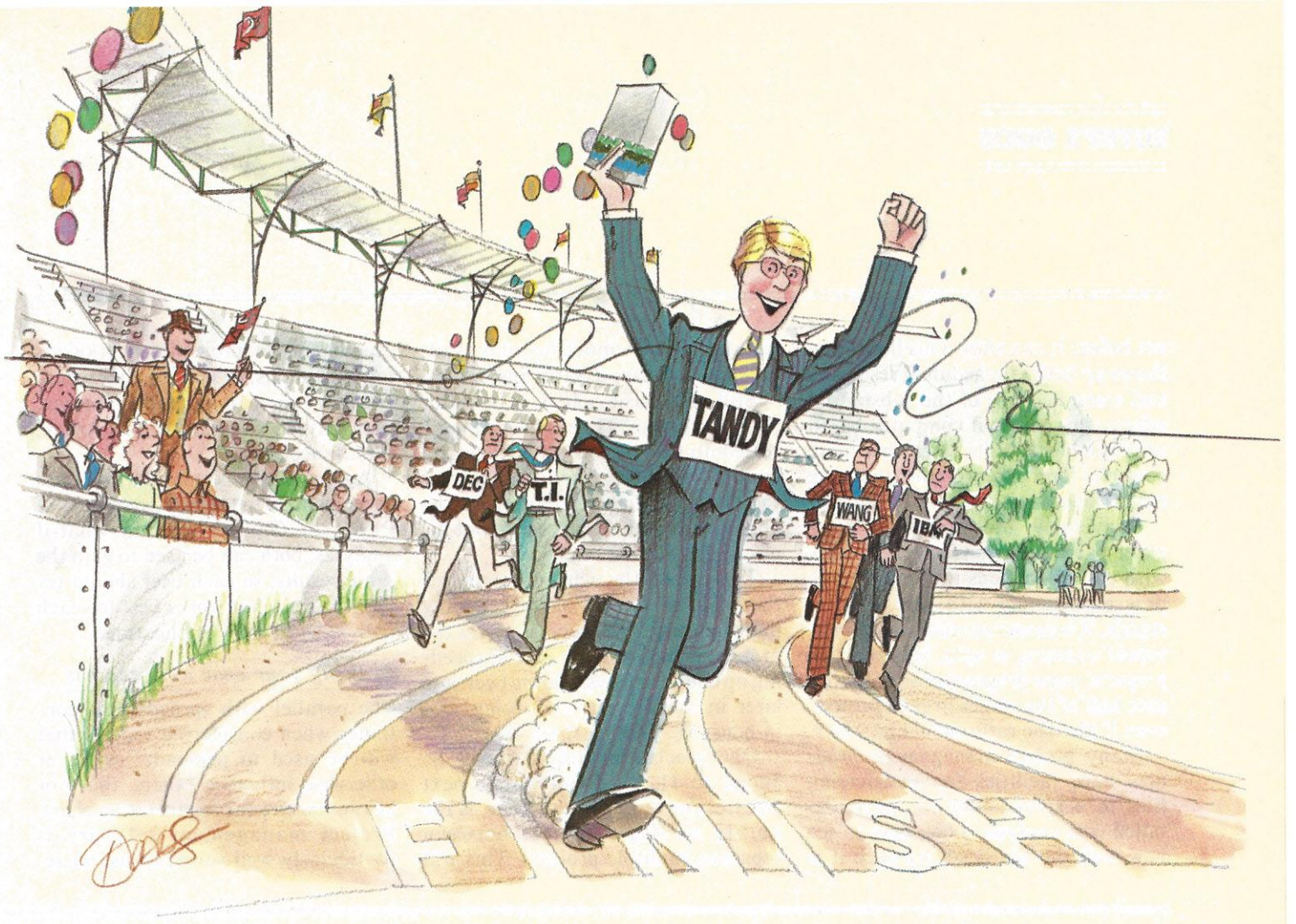
MacProject is significantly different. This program, to be released this month, boasts the familiar pull-down menus, elevator and all the other mouse-oriented tools of Apple's Macintosh. While programs such as Harvard Project Manager take data entered by the user and draw the chart for him, MacProject asks the user to draw the PERT chart, although it automates that task. Boxes representing the activities appear automatically. Extensive labels can be affixed and numerous times, such as earliest or latest start, affixed to the labels with only the most significant shown at any time. Blocks of activity symbols can be picked up and shoved around the screen like dominoes on a desktop.

Like so many software areas, there is no clear-cut, best approach. Selection is highly subjective.

Proponents claim that project management programs can perform what-if analysis in much the same fashion that spreadsheets are used by heavy-duty spreadsheet manipulators. While some advocates of minic - ter software are skeptical of personal computer systems' ability to handle detailed cost analysis—since large companies use such complex account code structures—there are a number of tools to enable tracking costs.

Advantages and limitations

If a program is keeping track of the number of hours secretaries, welders or programmers are required to finish a given project, it is a simple matter to enter the hourly wage, multiply and thus establish the cost range associated with that resource. Items to look for here are: whether the program can handle fixed as well as resource costs and how many can be ascribed to each activity. Next, can the program monitor cash flow or does it merely provide overall cost control? Some of the larger programs, more direct descendants of their ponderous predecessors from the world of mainframes, can't deal with individual people as resources. They can deal with hiring 100 carpenters, but they can't cope with the fact that Fred, the technician, has to personally tweak the prod-



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CIRCLE 17

uct before it can ship. This limitation shows up both in scheduling resources and costs; it is one of the substantial advantages personal computer-based software has over its ostensibly more powerful forebearers on the corporate mainframe.

Conversely, most personal computer-based programs have difficulty with cost allocations that mainframe programs handle with ease. For instance, if a resource, such as an individual's salary, is split between two projects, some programs can only allocate half of the wages to each project, even if the true ratio should be 9 to 1.

Many project management products have facilities for transferring files to a spreadsheet for more detailed cost analysis. Look here to see how well the file is set up once it is transferred, how much detail is available and how easy it is to transfer files.

Still, the basic job is to monitor time, not costs. "Time is everything," Halcomb says. "You can't negotiate the cost of a brick," so time becomes the crucial variable. Here again the approaches and results vary widely, offering a diverse selection.

Typical of the what-if scenarios that can be played out are adding more help during a crucial stage of the project; comparing the cost of speeding up one activity vs. adding overtime later in the project; and doing jobs in-house vs. jobbing them out.

One special feature that will be added to Harvard Software's next release, due out later this year, is the ability to flag conflicts between separate, multiple projects. This will greatly aid in projecting workloads for individuals, or pointing out where two users want an inflexible resource, such as the company's only truck, simultaneously.

Again, there is considerable disagreement as to the relative merits of PERT or Gantt charts in what-if analyses; both can be used to gain the same results, so each user should try them to see what works best for each individual in each application.

Making your case with reports

The parallel with spreadsheets continues when considering reports that will be used to persuade, cajole or otherwise influence others above or below you on your organization chart. Project management software is particularly well-suited to use in re-

Product/Company	Price	Systems	Min. Memory	Max. # Resources Per Activity	Max. # Activities Per Project	Max. # Projects
APECS/8000 ADP Network Services	$55,000	Unix-based systems	1Mb	64	unlimited	limited by disk capacity
CHIEF SOFTWARE: PROJECT MANAGEMENT, THE Maintenance Automation	$3900	IBM XT, compatibles	10Mb fixed and 256k	unlimited	99	10,000
CPM/PERT Elite Software Development	$249	CP/M, CP/M-86, MP/M, MS-DOS, PC-DOS	CP/M, MP/M=56k, other=128K	N/A	600	limited by disk capacity
CRITICAL PATH PROJECT MANAGEMENT MC↑2 Engineering	$295	CP/M, MS-DOS, TRS-DOS	64k	N/A	500	limited by disk capacity
DEMI-PLAN Demi Software	$50	MS-DOS; PC-DOS; TRS I, III, 4	TRS=48k, other=128k	1	100	limited by disk capacity
EMPACT Applied Microsystems	$149.95	IBM PC,XT; compatibles	256k	unlimited	250	100
EXECUTIVE PACKAGE, THE Alpha Software	$95	IBM PC, XT; compatibles; TI Pro; Wang	64k	user defined	user defined	40
EXPERT Decision Science Software	$115	IBM PC,XT; TRS III; APL II, Mac	48k	1	900	limited by disk capacity
GPERT Emerge Systems	$195	IBM PC, XT; compatibles; CP/M-80	IBM=192k, CP/M-80=64k	999	300	limited by disk capacity
HARVARD PROJECT MANAGER Harvard Software	$395	IBM PC,XT; compatibles	128k	N/A	limited by disk capacity	limited by disk capacity
INTEPERT Schuchardt Software Systems	$249	IBM PC,XT; compatibles	128k	26	1200	limited by disk capacity

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APL - Apple
COL - Columbia
COM - Compaq
CON TECH - Convergent Technologies
COR - Corona
DEC R - DEC Rainbow
GRID - GRID Compass
HP-125 - Hewlett-Packard-125
IBM - IBM
KAY - Kaypro
Lisa - Apple Lisa
Mac - Apple Macintosh
MPC - Most personal computers
OSB EXE - Osborne Executive

ports since it is inherently graphics oriented.

Among the features to look for here are: ability to print sideways (both Gantt and PERT charts can be lengthy); types of printers and plotters that can be driven (many users insist on plotters for high-quality presentation graphics, while others object to anything that can't accept form-fed paper and opt for dot-matrix printers); color support (surprisingly, few project programs to date can create color graphics); ability to integrate graphics into text (limited to Lisa, Macintosh and perhaps the soon-to-be-available Microsoft Windows package for the PC/MS-DOS world).

The ability to selectively print sections of Gantt and PERT charts as well as flexibility in selection of type faces are bonuses available in only a few packages thus far. Tabular reports can also be important and include breakdowns by cash flow, costs by man-hours and materials. Most managers will insist that breakouts be done by department, so make certain that these are readily available.

No substitute for skill

For major presentations, the hardware required to run the software again becomes a concern. Video hookups can be used with PC/MS-DOS computers so that large monitors, possibly several wired together in a daisy-chain, or video projection screens can be driven by the personal computer allowing audiences from conference-room size to a full auditorium to view the schedule charts. Despite all these features no package will make final decisions for the user. They can project slack time, but won't tell you how to make use of that time intelligently. They can help the manager point out conflicts and potential crises, but it's up to him to avoid them.

Project management software promises to emerge as a powerful planning tool of use to a vast range of managers. Yet it is only a tool. As consultant Halcomb puts it, "A word processor doesn't turn a writer into Shakespeare, a paint program doesn't turn the PC owner into Picasso and project management software won't turn the user into an excellent manager." But in the hands of a good manager, project management software can be a truly powerful tool.

Max. # Char Per Activity	Spreadsheet Capability Or Data Transfer?	On-Screen Displays: Pert-Type Milestones?	Critical path?	Precedence-Type Activities?	Gantt/Bar Chart?	Print Out Displays?	Use Printer Or Plotter?	(H)elp Function/ (E)rror Handling/ (S)ecurity?
unlimited	Yes	Yes	Yes	Yes	Yes	Yes	printer	H, E, S
title=a number, description=40	Yes	No	Yes	No	Yes	Yes	printer	H, E, S
25	Yes	hard copy only	hard copy only	No	segments only	reports only	printer	H, E
64	No	Yes	Yes	Yes	Yes	Yes	printer	E
20	Yes	No	No	Yes (20)	No	Yes	printer	H, E, S (TRS)
25	No	No	No	No	Yes	Yes	printer	H, E
user defined	Yes	Yes	Yes	Yes	Yes	Yes	printer	E (if programmed)
20	No	Yes	Yes	Yes	Yes	Yes	printer	H, E
30	No	Yes	Yes	No	No	Yes	printer, plotter	E
title=8, description=255	Yes	Yes	Yes	Yes	Yes	Yes	printer	H, E
8	Yes (InteCalc)	Yes	Yes	Yes	Yes	Yes	printer	H, E

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TI Pro - TI Professional
TRS - TRS-80 Models
TVD 802 - Televideo 802
Wang - Wang PC

ZEN 100 - Zenith Z-100
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MANAGEMINT Institute for Scientific Analysis	$395-$895	MS-DOS; CP/M; TRS II, III, 4, 12, 16	8-bit=64k, 16-bit=256k	4	8-bit=999, 16-bit=3000	limited by disk capacity
MICROGANTT Earth Data	$395	PC-DOS, MS-DOS, CP/M-80	CP/M-80=64k, other=128k	unlimited	unlimited	limited by disk capacity
MICROGANTT Westico	$395	PC-DOS, MS-DOS, CP/M	CP/M=52k, other=128k	limited by memory	100	limited by disk capacity
MICRO PERT 0 Sheppard Software	$350	IBM PC, XT; COM; Sen Part	192k	N/A	220	limited by disk capacity
MICROSOFT PROJECT Microsoft	$250	IBM PC, XT; compatibles	128k, 192k with mouse	8	128	limited by disk capacity
MICROTRAK SofTrak Systems	$595	OSB EXE; TVD 802; KAY; IBM PC, XT; compatibles; TI Pro; ZEN 100; Wang	CP/M=64k, other=128k	10	fixed=5000, floppy=1500	limited by disk capacity
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PATHFINDER Morgan Computing	$80	IBM PC, XT; compatibles	128k	N/A	3120	limited by disk capacity
PC-PATH Viplan	$995	MS-DOS	128k	N/A	500	limited by disk capacity
PERTMASTER Westminster Software	$695 with 1500 activ., $895 with 2500 activ.	CP/M-80, PC-DOS, MS-DOS	CP/M-80=64k, other=128k	10	1500, 2500	limited by disk capacity
PLANTRAC Computerline	$3000 first yr., $1000 each yr.	CP/M, PC-DOS, MS-DOS, TRS-DOS, Unix	CP/M, TRS=64k, other=128k	5	62,500	limited by disk capacity
PLAN/TRAX Omicron Software	$795	IBM PC, XT; compatibles	256k	10	700	limited by disk capacity
PMS-11 (RMS-II, MMS-II) North America MICA	$1295 ($995,$995)	MPC (except APL)	8-bit=64k, 16-bit=128k	96	8-bit=1200, 16-bit=2700	limited by disk capacity
PRIMAVERA PROJECT PLANNER Primavera Systems	$2500	IBM XT, compatibles	10Mb fixed and 512k	6	10,000	24 in directory/ disk capacity
PRO-JECT 6 Soft Corp.	$199	MS-DOS	160k	5	250	limited by disk capacity
PROJECT MANAGEMENT CMA Microcomputer	$69.95	APL II, II+, IIe, IIc, III; TRS I, III, 4, 4p	48k	256	256	limited by disk capacity
PROJECT MANAGEMENT Data Consulting Group	$52	PC-DOS, MS-DOS	64k	9	7	limited by disk capacity
PROJECT MANAGEMENT Institute of Industrial Engineers	$175, $140 for members	IBM PC, XT; compatibles; TRS I, III; APL II, II+, IIe, III in emulation mode	64k	300 1st program, 100 others	IBM=500, others=100	1

Max. # Char Per Activity	Spreadsheet Capability Or Data Transfer?	On-Screen Displays				Print Out Displays?	Use Printer Or Plotter?	(H)elp Function/ (E)rror Handling/ (S)ecurity?
		Pert-Type Milestones?	Critical path?	Precedence-Type Activities?	Gantt/Bar Chart?			
unlimited	Yes	Yes	Yes	Yes	Yes	Yes	printer	H, E, S
25	Yes	hard copy only	hard copy only	No	hard copy only	reports only	printer	E
8	Yes	Yes	Yes	Yes	Yes	Yes	printer	H, E
8	No	No	Yes	No	Yes	Yes	printer	H, E, S
30	No	Yes	Yes	No	Yes	Yes	printer	H, E
30	Yes (Multiplan)	No	Yes	Yes	Yes	Yes	printer	H, E
title 9=num., description=25	Yes ($59.95 conversion utility)	No	Yes	Yes	Yes	Yes	printer	E
30	No	No	Yes	No	Yes	Yes	printer	H, E
24	No	Yes	Yes	Yes	Yes	Yes	printer	H, E
30	Yes	Yes	Yes	Yes	Yes	Yes	printer	E
any number	No	No	hard copy only	No	hard copy only	reports only	printer	E
40	Yes	No	Yes	Yes	Yes	Yes	printer	H, E
50	Yes ($750)	Yes	Yes	Yes	Yes	Yes	printer, plotter	H
33	No	Yes	Yes	Yes	Yes	Yes	printer, plotter	E
numbers between 0-32, 766	Yes	hard copy only	hard copy only	No	hard copy only	reports only	printer	E, S
48	Yes	No	hard copy only	hard copy only	hard copy only	reports only	printer	H, E
30	Yes	Yes	Yes	Yes	Yes	Yes	printer	H, E, S ($35)
25	Yes	Yes	Yes	No	Yes	Yes	printer	E, S
12	No	Yes	Yes	Yes	Yes	Yes	printer	E
any number up to the number of activities	No	No	No	No	No	tabular reports only	printer	E

BUYER'S GUIDE

Product/Company	Price	Systems	Min. Memory	Max. # Resources Per Activity	Max. # Activities Per Project	Max. # Projects
PROJECT MANAGEMENT SYSTEM Viehmann Corp.	$2995	CP/M, Altos, Microsoft COBOL	64k	unlimited	unlimited	limited by disk capacity
PROJECT MANAGER Tandy Corp./Radio Shack	$99.95	TRS III	48k	unlimited	unlimited	limited by disk capacity
PROJECT MANAGER/TASK MANAGER/RECORD MANAGER Datamension	$499	IBM PC, XT; compatibles under MS-DOS	192k	26	1000-2000	limited by disk capacity
PROJECT MASTER Simple Software	$289	MS-DOS, PC-DOS	128k	20	100-500	limited by disk capacity
PROJECT PLANNER Applitech Software	$150	APL II, II+, IIe, IIc; (IBM PC 4th qtr.)	64k	N/A	100	limited by disk capacity
PROJECT PLUS Coade	$395	IBM PC, XT; compatibles	256k	15	500	limited by disk capacity
PROJECT SCHEDULER 5000 Scitor Corp.	$340 proj. mgmt., $395 proj. mgmt. 5000 with graphics	IBM PC, XT; TI Pro; Wang; GRiD; DEC R	256k	unlimited	5500	limited by disk capacity
PROMIS:PROJECT MANAGEMENT INTEGRATED SYSTEM Strategic Software Planning	$300	IBM XT, CP/M-86 (MS-DOS, PC-DOS 4th qtr.)	320k, 384k for color graphics	unlimited	800 at top level	limited by disk capacity
PROTRACS Applied Microsystems	$59.95	IBM PC, XT; compatibles	128k	unlimited	100	100
PROTRACS JR Applied Microsystems	$59.95	IBM PCjr	128k	unlimited	50	100
QUESTAIR:MULTIPLE OPTION QUESTIONNAIRE ANALYSIS PROGRAM D&M Software Publishers	$49.95	TRS I, III, 4	32k	unlimited	1	limited by disk capacity
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TASK Comshare	$329	CP/M-80, CP/M-86	8-bit=64k, 16-bit=128k	N/A	8-bit=350, 16-bit=500	limited by disk capacity
TASK MANAGER: MGMT TOOL FOR TRACKING DEPTS./PEOPLE RESPONSIBLE Quala	$395	IBM PC, XT, PCjr; COM; COR; COL	128k	unlimited	999	999
TIME LINE BreakThrough Software	$395	IBM PC, XT; compatibles	256k	16	unlimited	limited by disk capacity
TRACK II National Systems	N/A	IBM PC, XT; COL, Eagle	256k	26	unlimited	limited by disk capacity
VISISCHEDULE 1.2 VisiCorp	$195	IBM PC, XT; APL II IIe, III	APL II=48k; IBM, APL III=128k	9 types with 99 each	APL II=160; IBM,APL III=300	limited by disk capacity
WORKBENCH Applied Business Technology	$750 standard, $1150 advanced with updates for 12 mos.	MS-DOS, PC-DOS	256k	3	300	limited by disk capacity

Max. # Char Per Activity	Spreadsheet Capability Or Data Transfer?	On-Screen Displays: Pert-Type Milestones?	On-Screen Displays: Critical path?	On-Screen Displays: Precedence-Type Activities?	On-Screen Displays: Gantt/Bar Chart?	Print Out Displays?	Use Printer Or Plotter?	(H)elp Function/ (E)rror Handling/ (S)ecurity?
20	Yes	No	No	Yes	Yes	reports only	printer	H, E, S
title=8, description=50	No	Yes	Yes	Yes	Yes	Yes	printer	E
title=8, description=50	to Report Mgr. only	Yes	Yes	Yes	Yes	Yes	printer	H, E
20	Yes	No	Yes	Yes	Yes	Yes	printer	H, E
40	No	Yes	Yes	Yes	Yes	Yes	printer	H,E
20	Yes	No	Yes	No	Yes	Yes	printer	H, E
30	Yes	No	Yes	No	Yes	Yes	printer	E
title=5, description=30	Yes	Yes	Yes	Yes	Yes	Yes	printer, plotter	H, E, S
25	No	No	No	No	Yes	Yes	printer	H, E
25	No	No	No	No	Yes	Yes	printer	H, E
64	No	No	No	No	No	reports only	printer	H, E, S
title=19, description=65	Yes	Yes	Yes	Yes	Yes	Yes	printer	H, E
125—5 lines of 25 characters	Yes	hard copy only	hard copy only	No	hard copy only	reports only	printer	H (CON TECH, IBM Gantt only), E, S (CON TECH with hard disk only)
14	No	No	Yes	Yes	Yes	Gantt only	printer	E
40	No	No	No	No	Yes	Yes	printer	H, E
30	Yes	Yes	Yes	Yes	Yes	Yss	printer	H, E
6	Yes	Yes	No	No	Yes	Yes	printer, plotter	H, E, S
30	Yes	No	Yes	Yes	No	Yes	printer	E
title=60, description=20	Yes	Yes	Yes	Yes	Yes	Yes	printer	H, E

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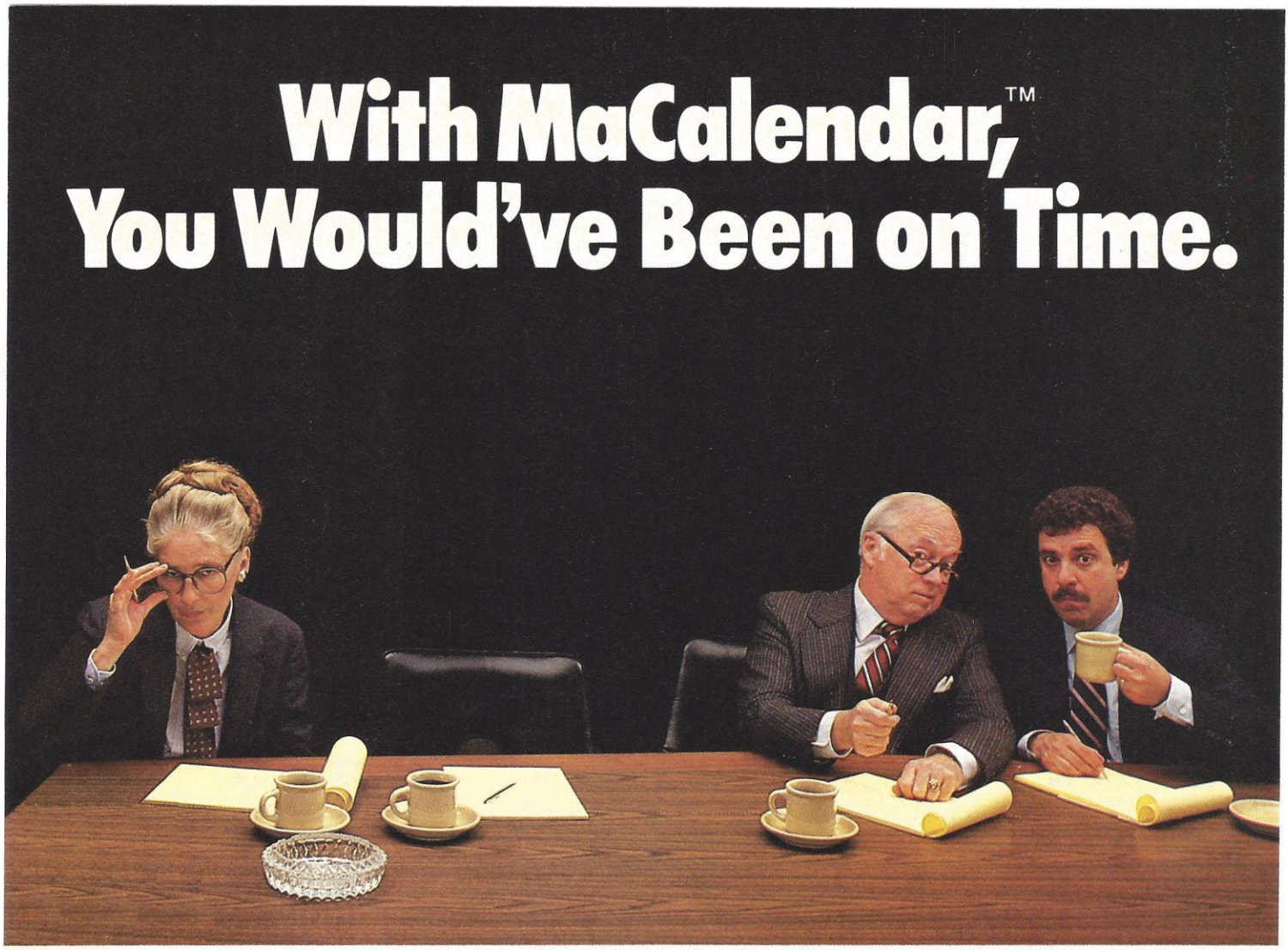

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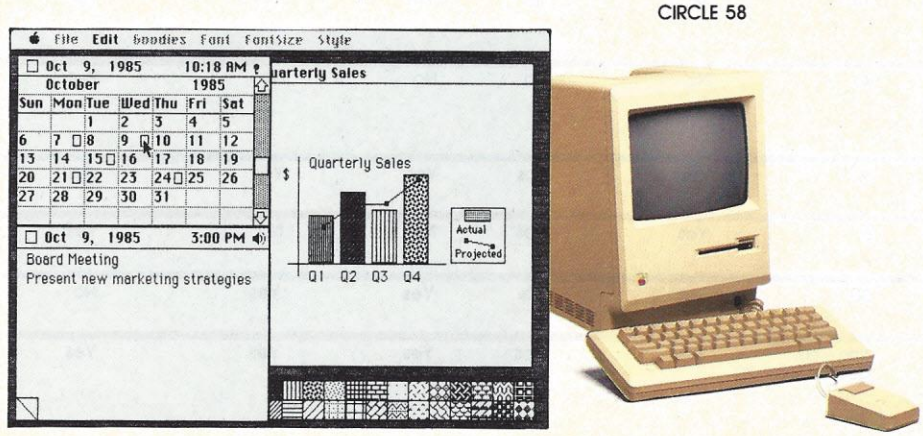

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CIRCLE 84

Which Modem Should You Buy?

If you have questions dealing with hardware, software, or applications, Personal Computing *will answer them in this monthly column. Please send your 'need-to-knows' to: Answers,* Personal Computing, *10 Mulholland Drive, Hasbrouck Heights, New Jersey 07604.*

Q: What are the advantages and disadvantages of an internal modem as opposed to a stand-alone modem?

A: An internal modem is essentially communications hardware that fits on a chip or on a printed circuit board instead of being packaged in its own stand-alone box. The board or chip resides inside the computer instead of on the desktop.

Advantages of such a setup include one less peripheral in your way and no cables to worry about. Travel with your computer is made easier, too, since there's less equipment to haul around. Also, says Linda Allmer, customer representative for modem manufacturer Racal-Vadic, by having the modem inside the computer, you greatly reduce risks of damaging it by accidents.

With an internal modem, you lose a lot of the "warning lights" that a stand-alone modem provides. Such lights keep you posted on your status when you're trying to hook up with another computer. They tell you when you are dialing, if you've connected, etc. Without them, it can be difficult to diagnose what's going wrong when you experience the inevitable troubles of telecommunicating.

Another feature of internal (or integral) modems which can be an advantage or a disadvantage, depending on your view, is that such modems normally come with communications software. This reduces confusion for the consumer who doesn't know which software package to buy. But it also limits you to the software the manufacturer has bundled with the modem—whether you like it or not.

Price differences between the two types, according to Allmer, are "very minimal," running from negligible to about $100 more for a stand-alone modem. Remember when comparing prices to factor in any software included with the modem.

Q: I own a Franklin ACE 1000 computer. Is it possible to expand the RAM? If so, how do I do it and what are the limits of the expansion?

A: It is not only possible to expand the random access memory on a Franklin ACE 1000, but it's also quite easy. Within the Franklin computer are seven expansion slots, each of which can hold a printed circuit board. Expanding the memory is as simple as purchasing one or more memory boards (which generally give you from 16k to 294k of extra memory) and inserting them into the slots.

From the hardware standpoint, there really are no limitations to the expansion capabilities. Up to five of the seven slots are available for extra memory boards, say Franklin technical support people. And several cards can be "piggybacked" on top of one another and still take up just one slot.

The real limit to expansion, according to Randy Savoy, general manager of Triangle Computer Systems, Inc., of Campbell, Calif., comes from the software. No matter how much memory you put in your computer, "You will only be able to use what your software can use," he says. There are only five or six programs for the Franklin ACE 1000 that he knows of that use more than the 64k of RAM the computer comes with.

Q: How do I transfer IBM files to the TRS-80 Model II?

A: There are three basic steps involved whenever tranferring files, according to Bruce Elliott, Tandy/Radio Shack's manager of marketing information.

First, you'll need a communications program for your computer. Then, you have to establish a physical contact between the two machines. This would involve either hardwiring the two together with an RS-232 cable and a null modem or a modem to modem link. Each modem must be operating at the same baud rate. Finally, Elliott says, you have to settle on the same protocols for both machines.

"You have to have the same word length, same parity (even, odd or none), and the same number of stop bits—normally one or two," Elliott says. "That way the machine getting the information knows how to decipher it."

Of course these steps are only a guideline. Elliott is assuming the files are ASCII text files. If they are not, there might be some problems in

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selecting a communications package. And, although he assumes "there are simple communications packages available that transfer IBM files," he's not familiar with any.

Q: You have previously stated that the Commodore 64 has only one RCA output plug to handle both sound and color picture input. I've heard otherwise. Can you please clarify this point?

A: According to Nathan Okun, president of CIVIC64, a Pet/VIC/C64 users group in Oxnard, Calif., the Commodore 64 has a 5- or 8-pin DIN plug for audio/video input/output in addition to the RF output plug. The 5-pin is in the older machines and the 8-pin is in the newer models (after roughly mid-1983). The 5-pin DIN plug uses one pin for ground and the other four for: video out (color/luminance)—no sound; luminance out (grey scale for monochrome monitors)—no sound; audio out—sound only; and audio in (allows external devices like an electric guitar to send sound through the C64's SID chip for mixing.

The 8-pin DIN plugs have all of the above mentioned features and add chrominance only (no luminance or sound) output for the special hookup at the back of the Commodore 1701 and 1702 color monitors. These pins are designed to be connected to the monitor via a "5/8-pin-DIN-to-4-RCA-jack" cable—readily available at most electronics shops.

Okun says the older 5-pin Commodore 64 machines and a few of the earliest 8-pin models have versions of the VIC II chip (which makes the picture for both color and monochrome monitors that is also used by the RF box) which do not provide a very good color output but excellent monochrome output. (This is the reason for the special 1701/1702 back plugs, which fix the problems almost completely.)

The newer 8-pin models have new VIC II chips that give a very good or even well-nigh perfect color picture using almost any monitor or TV. (Some TVs, especially Zenith models with picture "enhancement" circuits, will not work with a C64, but Okun reports his cheap 13″ color TV has a virtually perfect picture with both normal and C64 inputs.)

The 1701/1702 back plugs can provide you with an even better picture, says Okun, but they are no longer a necessity to get a first-rate color picture on the new Commodore 64's.

Q: I'm in the market for a printer. I've been reading about the new dot-matrix printers that offer correspondence-quality printing, but I'm not sure if I need that much quality.

A: The kind of printer you should buy depends on what applications you need the printer to perform. It has been estimated that only about three percent of all the people who buy a printer actually need a daisy-wheel. According to a spokesman for Okidata, a printer manufacturer, for the vast majority of applications the printer of choice is a dot-matrix.

This is especially true today because recent advances in dot- matrix technology have closed the gap between the respective qualities of daisy-wheel and dot-matrix printers. The newest dot-matrix printers, like those from Okidata, achieve the "letter-quality" standard usually associated with daisy-wheel printers.

If you simply must have correspondence that looks like it just came off a typewriter, then a daisy-wheel printer may be what you need. On the other hand, if you're interested in creating graphics or pie charts along with your correspondence and you want speed and versatility, dot-matrix is your only choice, the company says.

In addition, if price is also a consideration, you may decide that your application is suited to a dot-matrix unit because daisy-wheel printers generally cost more.

Q: Is there a disk drive compatible with the Adam computer system and can I run Apple software on the system using the drive?

A: Coleco has introduced a 5¼″ single-sided, double-density disk drive for the Adam that stores up to 160k, says Coleco's Andy Herbert. However, the Adam is equipped with a unique software system called the Digital Data Drive which allows software to be run on high-speed magnetic tape.

Software for the Adam computer will be made to run on either the Digital Data Drive or the disk drive. Apple software, however, is not compatible with this system and therefore can not be run on the Adam.

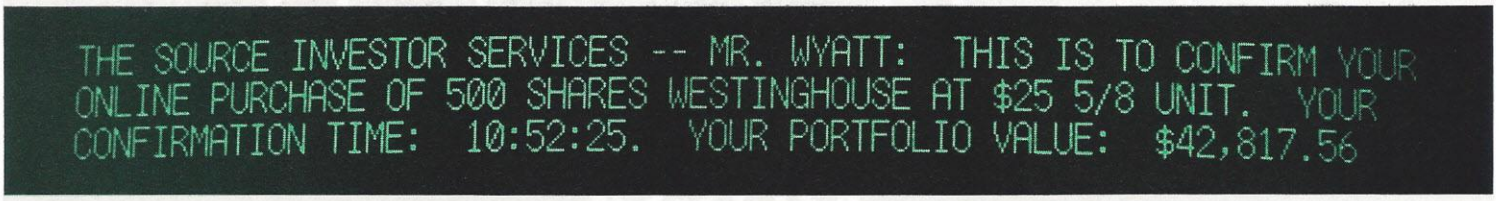
Q: What telephone line frequencies are used by modems and are these frequencies used in most modems?

A: Warren Hodges of Hayes Microcomputer Products, Inc., explains that the standard frequencies most modem manufacturers use are the Bell 103 and the Bell 212A frequencies. The Bell 103 frequency runs at 300 baud (baud is the speed of transmission) and the Bell 212A frequency runs at 1200 baud. Using the same standard for each modem makes communication easier, says Hodges. Most companies have adopted the Bell standard to eliminate any confusion and to allow the communication to take place much more easily.

"Frequencies can vary from modem to modem," he says. Some modems are able to transmit and receive at higher frequencies. These "high-speed carrier frequencies" allow some modems to communicate faster than others that use a 300-baud rate.

"In order for one modem to talk to another, a specific frequency must be used for both modems," says Hodges. For example, you could not transmit information to a 1200-baud modem using a 300-baud modem. A 300-baud modem communicates at

Not Dow Jones.



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PPGA104

CIRCLE 102

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What's more, the TeleColor PC also comes with the popular PC™-DOS compatible operating system and three essential business software programs—word processing, spread sheet and data base management.

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Standard Features

- Word processing, spread sheet and data base software
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CIRCLE 105

ANSWERS

about 30 characters per second while a 1200-baud modem would be four times as fast communicating at about 120 characters per second. Each character is about 10 bits.

Q: Is there an optimum time of the year to purchase a computer?

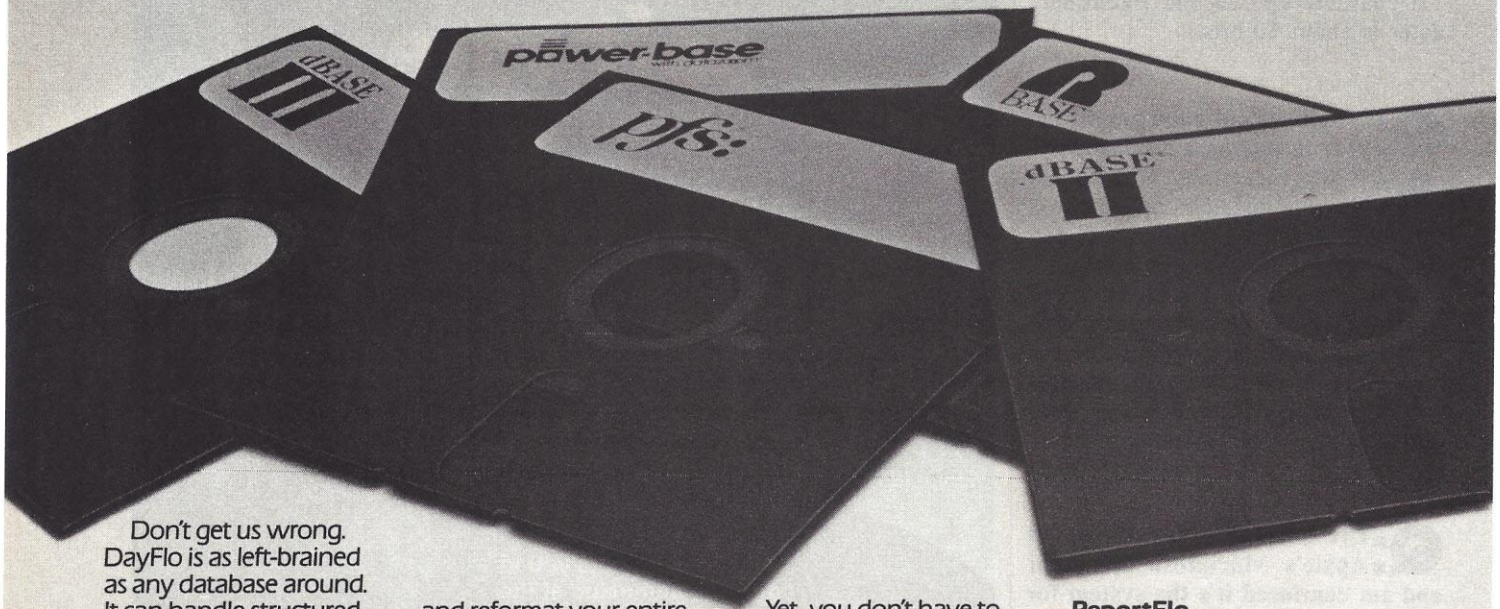
A: While there may be sales on lower priced, less sophisticated models during the Christmas holiday season, generally there is no "best" time to buy a computer. However, at present there is a lot of competition in the computer marketplace. Prices have never been more advantageous for a consumer interested in per-dollar performance features.

Q: I've become a fanatic about Apple's Macintosh computer and am convinced it's the system for me. However, recently a friend raised a question about potential problems from placing the Mac's disk drive so close to a heat source: the monitor. My friend contends that disk damage and data loss can result and that the problem is compounded by the lack of proper insulation and a fan. Is this true?

A: It is correct that the Macintosh's disk drive is near its monitor which produces heat, but that should not cause any problems. Kathleen Dixon, a spokesperson at Apple Computer, says the ventilation built into the Macintosh is sufficient to handle heat from the monitor or any other part of the machine.

"From what I understand of the Macintosh's design, it's very efficient and doesn't generate much heat," says Daryl Jackson, marketing representative for ComputerLand in Totowa, New Jersey. "We have a Mac working all day long and have yet to have a problem." Jackson adds that he knows of no customers who have complained of problems resulting from the monitor generating too much heat.

Traditionally, databases have been left-brained.



Don't get us wrong. DayFlo is as left-brained as any database around. It can handle structured information such as customer lists and personnel records. Keywords and field names are used to gain access to records.

Just like traditional databases.

However, solving traditional problems in traditional ways is just one side of DayFlo. It's also flexible enough to handle today's new challenges in exciting new ways.

And that's where strictly left-brained databases get left behind.

The First Free-Form Database.

In the real world, there's always an exception to the rule.

Which wreaks havoc on traditional databases. For example, because of fixed formats, entering a new field such as a Telex number into a single customer record is next to impossible. Unless you're prepared to reprogram and reformat your entire database.

DayFlo, on the other hand, eliminates these tedious operations.

Word-Oriented Database.

Unlike traditional databases, DayFlo has integral word processing. For instance, you can store letters and memos along with customer lists in the same database.

Now you're free to manipulate data at will. Free to enter, retrieve, edit and shuffle information whenever and wherever you please.

Every fact you need, from key client lists to spontaneously entered notes and ideas, is just a few keystrokes away.

Power, Yes. Programming, No.

DayFlo is a powerful package that runs on an IBM PC with hard disk, Compaq Plus, or compatibles.

Yet, you don't have to be a programmer to use it.

So you see, DayFlo is a much greater information management tool than any traditional database. Much more flexibility and power than pfs. Much easier to use than dBASE II.

ReportFlo.

With our ReportFlo package, you can produce presentation-quality documents, reports, letters, memos and so forth from the data stored in DayFlo. This potent report writer also performs calculations.

COMPARING DAYFLO TO TRADITIONAL DATABASES

TRADITIONAL DBMS	THE BENEFITS OF DAYFLO
• Fixed record format. All records must look alike.	• Free-Form record format. No two records need look alike. All record formats are stored in same database.
• No word processing capabilities.	• Integral word processing. Create and store letters, memos, notes, ideas, etc.
• Fixed field length.	• Variable field length. No counting character spaces.
• Adding new fields requires remapping or reformatting of database.	• Instantly add new fields to existing records without reformatting the entire database.
• One value per field.	• Multiple values per field. Information where you want it.
• Retrieves data based on pre-planned criteria only.	• Retrieves information based on content or key words.

WHAT YOU CAN DO WITH DAYFLO

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- Sales Lead Tracking
- Personnel Records
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- Note Taking
- Purchase Order Tracking
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- Field Service Tracking
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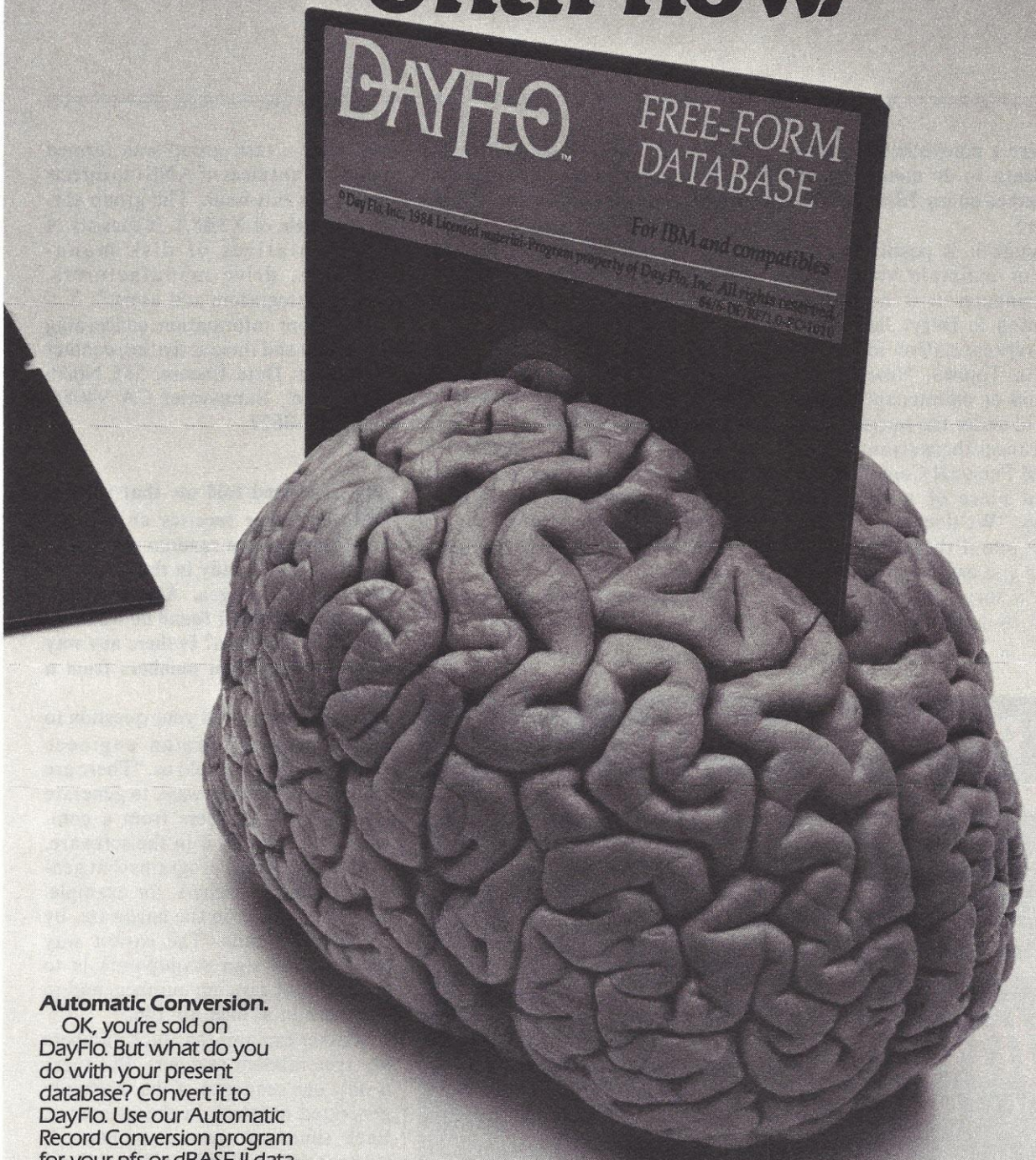


Automatic Conversion.
OK, you're sold on DayFlo. But what do you do with your present database? Convert it to DayFlo. Use our Automatic Record Conversion program for your pfs or dBASE II data.

Seeing Is Believing.
Visit your nearest DayFlo Dealer and see DayFlo in action for yourself. Or, if you prefer, we'll send you a Demo Disk for $10. For details, call 1-800-7DAYFLO. In California, call 1-800-CDAYFLO.

And please ask questions. Anything your brain, either side, can conjure up.

DAYFLO™

The right brain will love it.

CIRCLE 89

DayFlo, Inc., 2500 Michelson Drive, Building 400, Irvine, CA 92715

ANSWERS

Q: Is there a non-technical way I can learn to do minor repairs and maintenance on my IBM Personal Computer?

A: Although it is possible to repair or maintain your IBM Personal Computer it is not advisable, according to Daryl Jackson, a marketing representative for ComputerLand in Totowa, New Jersey. Doing repairs or maintenance yourself while still under the warranty period could cancel the warranty.

"The IBM Personal Computer is a complicated piece of machinery," Jackson says. "We don't recommend people delve into it themselves."

One thing you can do on your own is purchase a surge protector if you are plagued by power surges. Other than that, Jackson recommends taking your computer to your dealer every four to six months for a "tune-up." The disk drives should be cleaned and aligned, he says, because "they are the only moving part and tend to wear."

Q: Why can't I run my IBM formatted diskettes on my co-worker's Apple II Plus?

A: Having read this question in this section before, W.B. Proctor, senior staff engineer for Data Encore, recently wrote to inform us that this problem is currently being worked on.

"Not everyone has turned a deaf ear to users' needs," Proctor says. "A year ago, a task group was formed under the auspices of ANSI to directly address this issue. The group carries the title of X3B8.1. It consists of representatives of disk manufacturers, drive manufacturers, systems integrators and users."

For more information concerning this group and their activities, contact Proctor at: Data Encore, 585 North Mary Ave., Sunnyvale, CA 94086; (408) 725-0627.

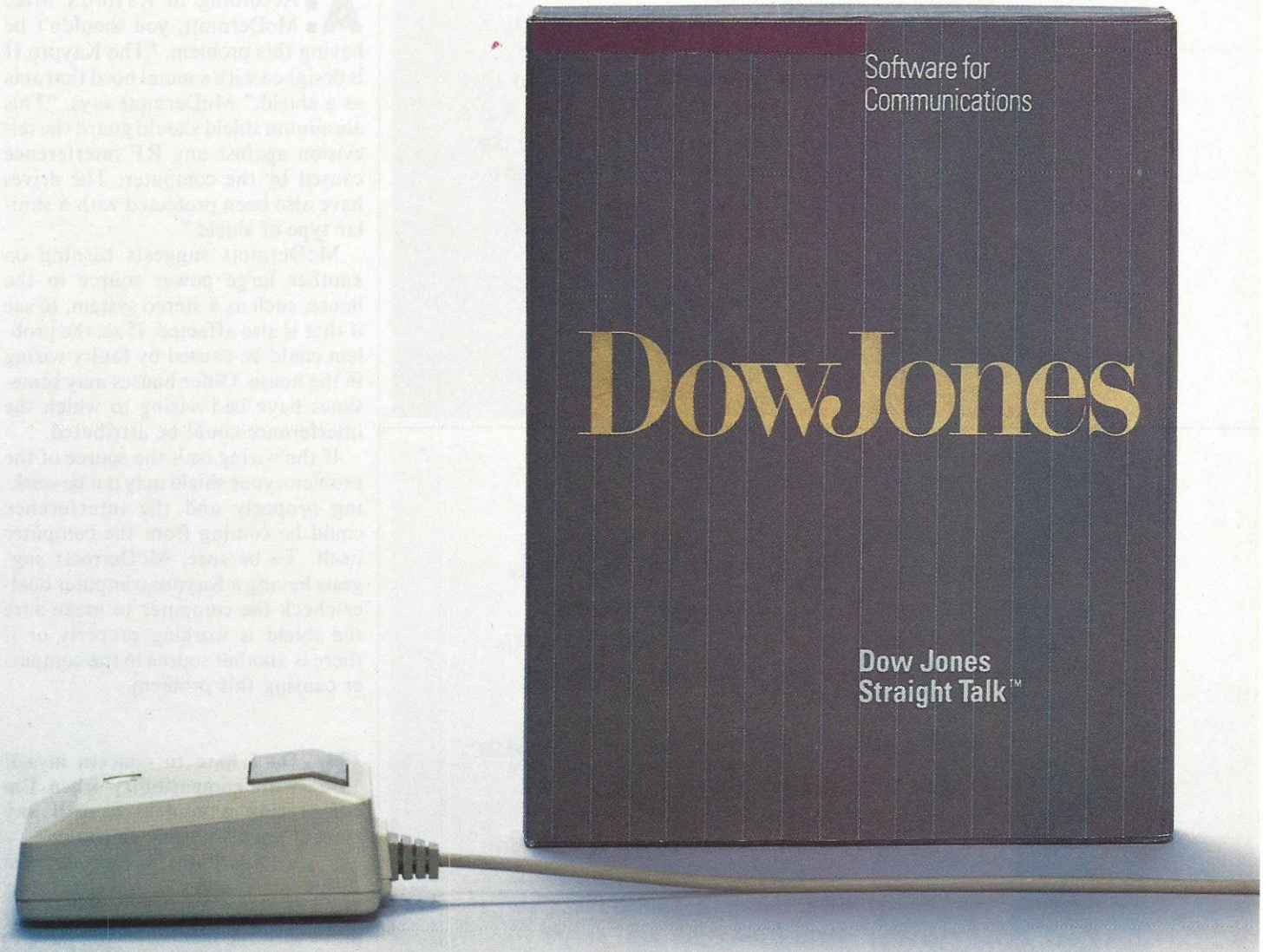
Q: A friend told me that when a computer receives an instruction to generate a random number, it goes to a set already in the computer that never changes. After experimenting with this I found he was correct. Why is this so? Is there any way to get true random numbers from a computer?

A: We presented your question to computer design engineer Mark Walker, who told us, "There are a hundred different ways to generate true random numbers from a computer. You can do it in the software, by writing BASIC programs that generate random numbers, for example. Or you can do it in the hardware, by designing circuits. The easiest way (from the design standpoint) is to have a set of random numbers and to put them in a 'look-up' file."

Walker explains that such numbers *are* true random numbers. But there is only one sequence of the randomly generated numbers in the computer. Each time you want a number, it starts at the top of the list. You will get the same numbers, in the same order, each time. "So from the user's point of view," Walker says, "it looks like the numbers aren't random."

As for your objective—obtaining numbers from the computer that you can't predict—the BASIC command "Randomize" may fit the bill. A randomize statement at the beginning of a program will change the sequence of random numbers every time the program is run.

Now there's smart software™ for the Macintosh.



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CIRCLE 92

ANSWERS

Q: When I turn on my Kaypro II, television reception is degraded in the entire house. What, if anything, can be done to end this problem?

A: According to Kaypro's Mike McDermott, you shouldn't be having this problem. "The Kaypro II is designed with a metal hood that acts as a shield," McDermott says. "This aluminum shield should guard the television against any RF interference caused by the computer. The drives have also been protected with a similar type of shield."

McDermott suggests turning on another large power source in the house, such as a stereo system, to see if that is also affected. If so, the problem could be caused by faulty wiring in the house. Older houses may sometimes have bad wiring to which the interference could be attributed.

If the wiring isn't the source of the problem, your shield may not be working properly and the interference could be coming from the computer itself. To be sure, McDermott suggests having a Kaypro computer dealer check the computer to make sure the shield is working properly or if there is another source in the computer causing this problem.

Q: Do I have to concern myself with compatibility when I'm considering a modem or will any modem work with any computer?

A: Compatibility is definitely an issue when you're talking about modems. But it's not compatibility with the *computer* you have to worry about. The modem views all computers as dumb terminals waiting for information to be transmitted.

It's compatibility with the *modem on the other end* that is vital. According to Linda Allmer, customer representative for modem manufacturer Racal-Vadic, different modems use different protocols (which are sets of rules governing the exchange of information). You must make sure the protocol of your modem is compatible

with that of the modem on the other end. Such protocol information should appear on the product's packaging, Allmer says.

Q: Would I be able to use any of the Hayes modems with my Commodore 64 if I get an RS-232 interface?

A: According to Charles Jackson at Hayes Microcomputer Products, Inc., you will be able to use two of the Hayes line of modems. You could either use the Hayes Smartmodem 300 or Smartmodem 1200 with your Commodore 64.

These Smartmodems are compatible with any personal computer (including the Commodore 64) which supports an RS-232 plug.

Q: Is there any way to connect my Apple IIe to my color television set without using an RF modulator?

A: According to Marty Fpergel, president of M&R Enterprises, a company that manufactures RF modulators, you must use an RF modulator to connect the Apple IIe to the color set.

Fpergel explains that the RF modualtor converts a video signal into an RF signal (radio frequency) which is conducive to the input of the television set. Televisions simply do not accept video signals which are essential when using it as a computer monitor.

WE MISSED ONE

In our August Buyer's Guide to ink-jet printer manufacturers (page 154), we inadvertently omitted the listing for Siemens Communications Systems, Inc. The company manufactures three ink-jet units: Model 2712 ($2225), Model PT88 ($895) and Model PT89 ($1145).

For more information on these printers, write to Siemens at 5500 Broken Sound Blvd., Boca Raton, FL 33431; or call (800) JET-TECH, (305) 994-8800 (in FL).

Announcing a small im

It's 12″ x 11¼″ x 2¼″.
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The IIc has a full-size keyboard.

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The versatility to run over 10,000 different software programs.

The ironclad reliability of the first true VLSI motherboard.

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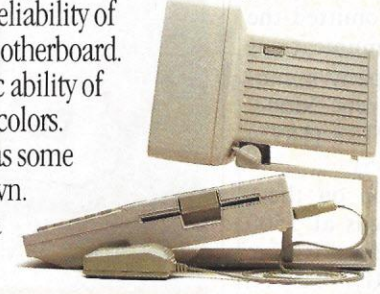
For instance, a switchable 80/40-character display.

Switchable QWERTY/Dvorak keyboard.



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A built-in half-high 143K single-sided disk drive.

Built-in serial ports for modems, printers and an extra half-high drive.

Even built-in mousetronics so it's ready to use a mouse and all the new Apple II mouseware.

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ovement on the Apple IIe.

Including the new Apple Scribe—Apple's first full-color print-on-anything printer for under $300, it can handle anything from business graphics to term papers.

The IIc's father, of course, is the granddaddy of the whole personal computer industry, the Apple IIe. Which, lest we forget, has quite a few improvements of its own this year.

The IIe can now use our ProFile™ hard disk—so it can store about 2400 pages of anything you'd like to remember.

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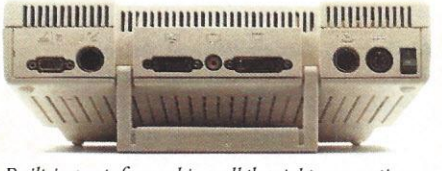


Built-in ports for making all the right connections.

You can increase its RAM to an elephantine 512K. Add a Z-80 card to run CP/M.™

In fact, you can grow it with enough cards and peripherals to run just about any family business. Like Saudi Arabia.

So you see, the only question is whether you need an expandable Apple II. As in IIe.

Or a compact Apple II. As in IIc.

Just visit your friendly authorized Apple dealer.

And tell them what size improvement you'd like.

** Don't asterisks make you suspicious as all get-out? Well, all this one means is that the IIc CPU alone weighs 7.5 pounds. The power pack, monitor, an extra disk drive, a printer and several bricks will make the IIc weigh more. Our lawyers were concerned that you might not be able to figure this one out for yourself. ** The FTC is concerned about price-fixing. So this is only a Suggested Retail Price. You can pay more if you really want to. Or less.*

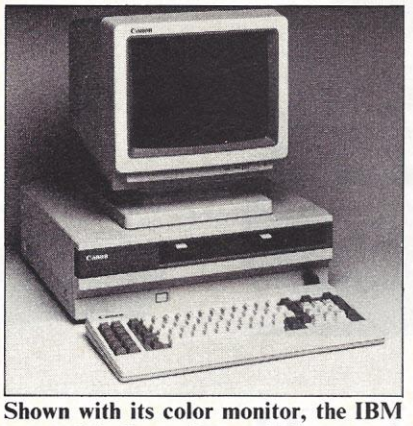
For an authorized Apple dealer nearest you, call ***(800) 538-9696.*** *In Canada, call* ***(800) 268-7796*** *or* ***(800) 268-7637.***

SYSTEMS

CANON PERSONAL COMPUTER CANON TX-50

Canon USA has taken two more steps into the personal computer field with the introduction of the IBM Personal Computer-compatible Canon Personal Computer and the TX-50 desktop.

Showing confidence that the IBM compatible market will grow, Canon designed its new personal computer to run most programs written for the IBM Personal Computer and to read/write IBM disks. It utilizes most of the peripheral boards for the Personal Computer and has a compatible keyboard layout.



Shown with its color monitor, the IBM compatible Canon Personal Computer is designed to run a wide range of applications software.

Canon's Personal Computer has a 16-bit 8086 microprocessor designed to provide high performance for screen and data handling. A monochrome or color monitor is available. Both monitors have a 12″ non-glare green phosphor screen with a capacity of 40 or 80 by 25 lines. Pixel resolution on the color model is 640 by 200 in black and white graphics and 320 by 200 for four-color graphics.

Other standard features include serial and parallel interfaces and 256k of memory. MS-DOS 2.1 and GW Basic 2.0 are part of the standard configuration. The Canon Personal Computer is priced at $2495 with the monochrome monitor and $2995 with the color monitor.

Canon is billing its TX-50 as the eventual successor to the previous TX models. It is designed to handle a variety of business applications in such fields as manufacturing and accounting.

At the heart of the TX-50 is a 16-bit 8088 microprocessor running under MS-DOS. It has 128k of memory standard and a 3″ floppy disk drive. Two slots are provided for optional expansion boards.

The monitor for Canon's newest desktop is a 7″ flat face monochrome unit with a pixel resolution of 480 by 200. The TX-50's printer has a print speed of 1.2 lines per second, maximum of 30 characters per line and an enlarged print face.

Retail price of the TX-50 is $1295.

FOR MORE INFORMATION: CANON USA, Systems Division, One Canon Plaza, Lake Success, NY 11042; (516) 488-6700.

CIRCLE 373

Super Sr. Partner

The Super Sr. Partner includes a thermal printer capable of printing 132 characters per line and an RGB monitor. The standard 128k RAM is expandable to 512k. The hard disk drive stores 10Mbytes of data. Centronics parallel and RS-232 ports are provided.

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CIRCLE 374

PERIPHERALS

Alphapro Daisy-Wheel Printer

Designed to interface with RS-232, RS-422 and Centronics parallel ports, Alphapro prints at 18 cps. Features include proportional spacing, boldface, double strike, strikeout, superscripts and subscripts and reverse line feed.

$399.95

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2323 South Bascom Ave.
Campbell, CA 95008
(408) 599-8000
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CIRCLE 375

DPMG9 Printer

The DPMG9 is a bidirectional 80-column printer with a draft-quality print speed of 180 cps. It is compatible with the IBM Personal Computer and XT, and Epson FX-80.

$695

Fujitsu America, Inc.
3055 Orchard Dr.
San Jose, CA 95134
(408) 946-8777
retail

CIRCLE 376

F-60 Thermal Transfer Printer

With print speeds of 20 to 80 cps, the F-60 has draft-, near-letter-quality and letter-quality printing and can print on transparencies and fan-folded paper. The standard interface is Centronics parallel.

$545

Canon USA
Printer Division
One Canon Plaza
Lake Success, NY 11042
(516) 488-6700
retail

CIRCLE 377

GPAD-C Parallel Printer Adapter

GPAD-C allows any printer with a Centronics interface to be connected to any computer or controller with an IEEE-488 interface. No special programming or software is required.

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Connecticut microComputer, Inc.
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Brookfield, CT 06804
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direct order

CIRCLE 401

Kaypro Letter-Quality Printer

Printing at a speed of 18 cps, the printer has a 2k buffer standard. Other features include Centronics-type interface, proportional spacing and standard character sets including several foreign languages.

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Kaypro Corp.
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Requires: IBM PC, XT, or PC compatible; 64K; 1 disk drive; monitor.

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(Swan) Create, edit, search, sort, and merge up to 32,000 records a file, up to 35 fields a record with this full relational data base system. Includes the complete source code needed to implement *PDBS* using IBM Turbo Pascal. **#7273-2, $49.95**

Requires: IBM PC, XT, PCjr, or PC compatible; 128K; 1 or 2 double-sided, double-density disk drives; 80-column display; PC DOS/MS DOS 2.0 or 2.1; Turbo Pascal 1.00 or 2.00.

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HAYDEN

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CIRCLE 106

Easy as 1-2-3™

(Micro Workshop of Cambridge) The next best thing to having an instructor at your side, this is both a step-by-step tutorial and a collection of ready-to-use business models. Focusing more on *what* to use 1-2-3 for than *how* to use it, this package helps you understand the capabilities of various 1-2-3 commands by placing you in the role of manager of a hypothetical retail chain. **#7283-X, $39.95**

Requires: IBM PC or PC compatible; 1 disk drive; Lotus 1-2-3 System; monitor.

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CIRCLE 378

Password 300
A 300-baud modem with auto-dial, auto-answer capabilities, the Password 300 has a built-in RS-232-C cable; its user-selectable options allow hookup to any type of RS-232-C port.

Designed to work with Telpac, U.S. Robotics's telecommunications software package, the Password 300 operates on either Bell System or dedicated lines.
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Chicago, IL 60607
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CIRCLE 379

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Available for most dot-matrix and letter-quality printers, Acousticovers are designed to reduce printer noise.
$124 to **$476**
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CIRCLE 380

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CIRCLE 402

Connection Kit
The Connection Kit consists of an interface cable designed to ensure an exact connection between Qume's LetterPro 20 daisy-wheel printer and the Apple IIe and IIc, IBM Personal Computer and ITT XTRA personal computer.
$45 (Apple IIe, ITT XTRA, IBM Personal Computer)
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CIRCLE 403

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For small business computer systems, the jackets are designed to be antistatic, waterproof, dustproof, stain resistant and fire retardant.
$29.95
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CIRCLE 381

Encore
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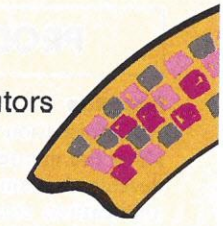

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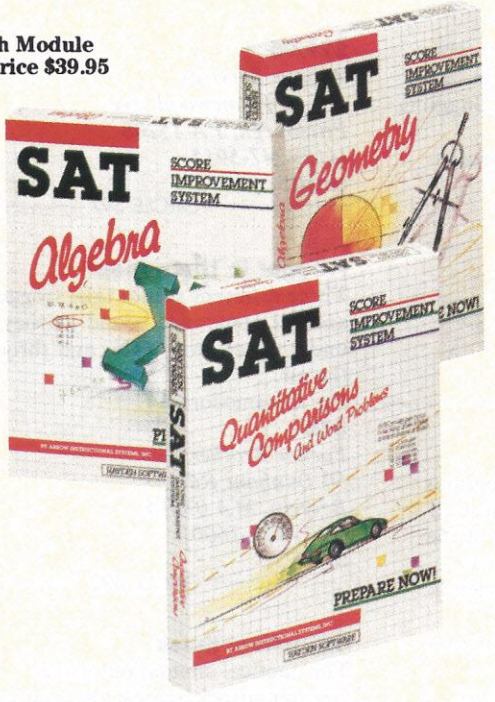

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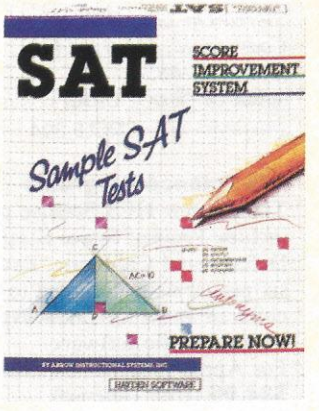

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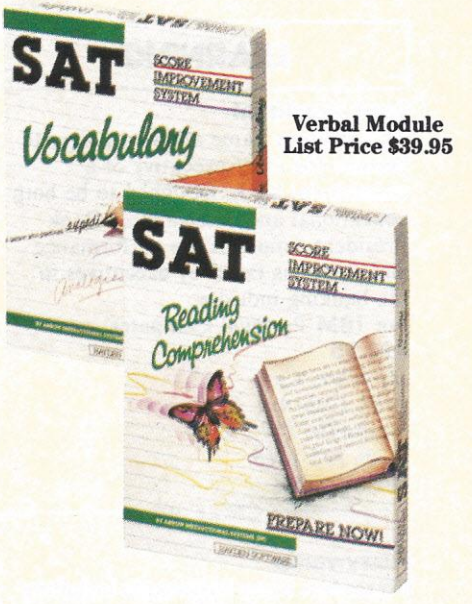

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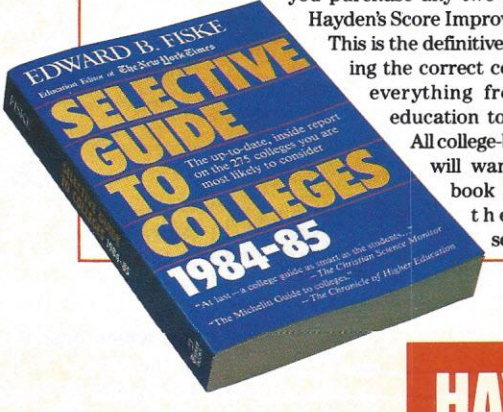

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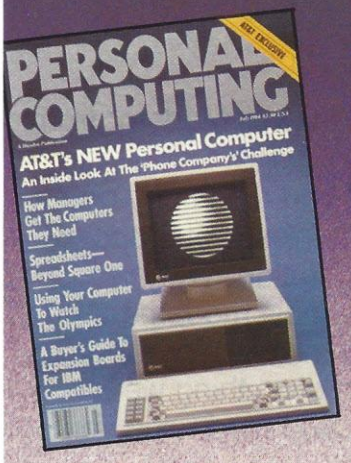

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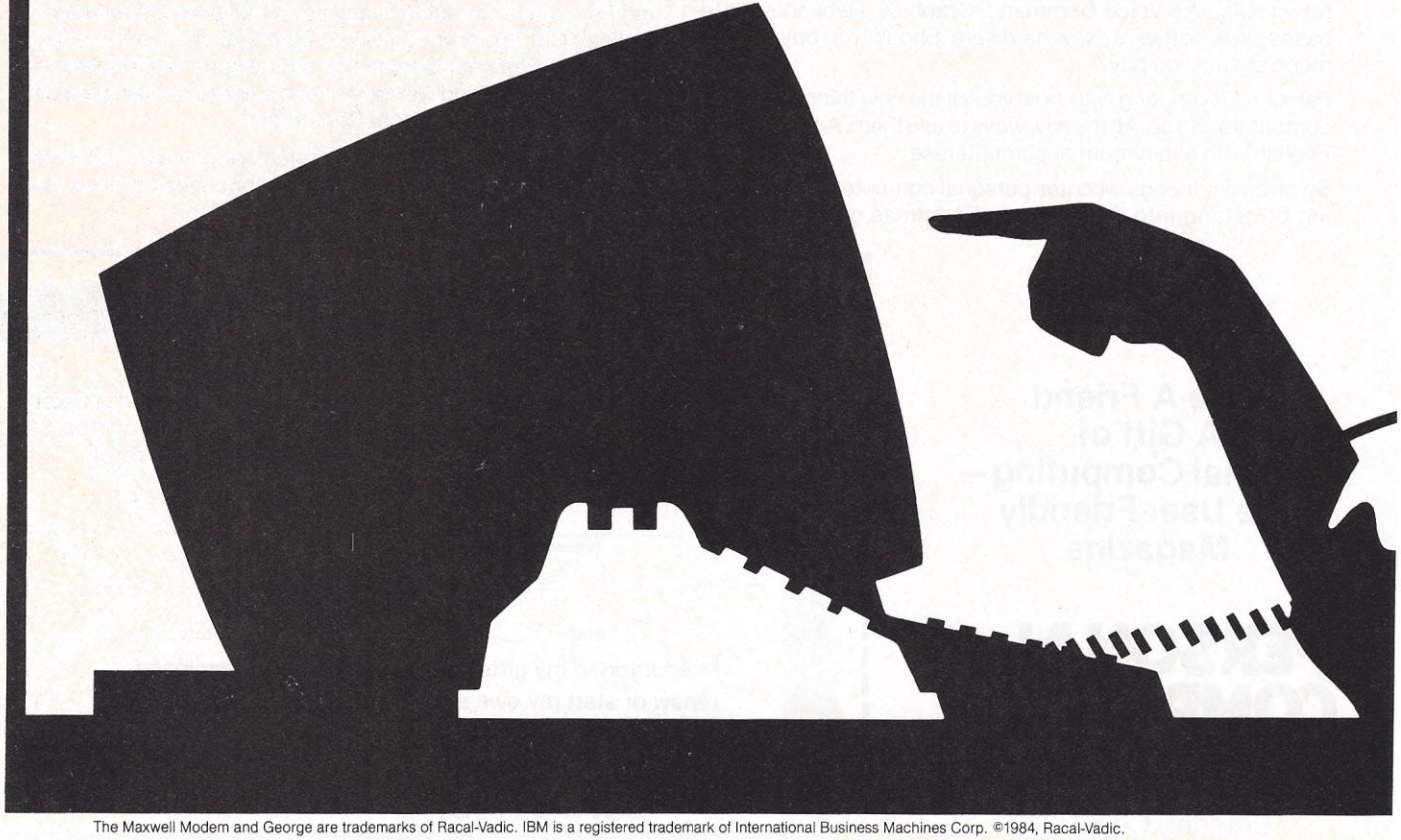

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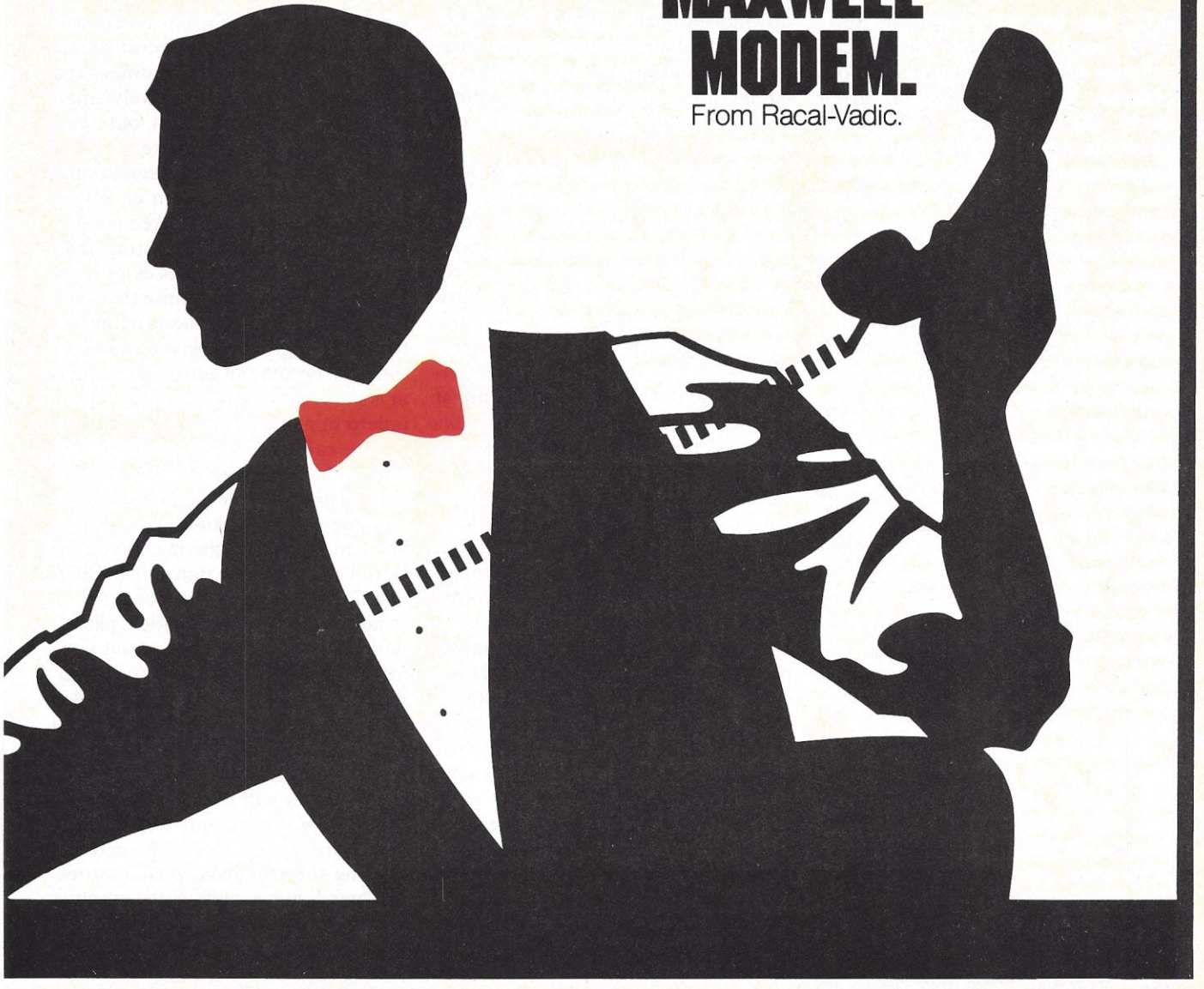

Text Adventures: Programs That Make You A Star

Some recreational programs use words—not graphics—to provide vivid experiences in settings that range from fantasy dungeons to corporate boardrooms

by Lee Thé, Associate Editor

When you play Synapse Software's Encounter, you use your personal computer to enter a vividly colored, three-dimensional alien world. On the screen, a flat plain stretches out towards the cloud-capped mountains on the horizon. Pylons dot the otherwise featureless plain. A radar display shows an intruder maneuvering toward you. Push right on the joystick, and your view swings to the right. Your gunsight sweeps over a white speck in the distance. This speck advances rapidly, resolving into a saucer-shaped vehicle that starts firing energy pulses at you. You take a hit. Your view shimmers under the blast and you've lost part of your shielding. You pull back on the joystick and the plains recede past you, giving you room to maneuver as you fire a steady stream of energy blasts back at your adversary. One hits a pylon and ricochets into the saucer which was beside it. It blows the saucer away in a spectacular explosion, but you barely notice as you rush forward to attack two more intruders appearing on your radar.

Such is the action in one of the more dynamic of the game programs that rely heavily on graphic screen displays for their recreational value. Text-based interactive stories, on the other hand, provide little, if any, of the visual excitement evident in Encounter. Rather, these programs depend greatly on your ability to conjure up "movies of the mind." Text-based recreational software creates its situations by using words and numbers—not pictures—that act as the medium of interaction between man and machine.

You could call such literate software programs "text adventures," though strictly speaking, that term simply means interactive prose stories in which you write your queries, responses and commands using English sentences (rather than multiple choice selections or entering numbers). In a broader sense, text adventure programs include any kind of simulation or story that *mainly* uses text rather than graphics as its interface.

Some text adventure game proponents point out that the human mind has better "graphics processing capability" than any personal computer—the mind, in other words, can imagine a more vivid visual accompaniment to a situation than a personal computer can create. However, it is a fact that image-based recreational software outnumbers text-based products by a wide margin, even though the average comic book easily bests the crude image quality of most of these graphics-dependent games. People become enthralled by colorful packaging that promises wondrous image quality. Such quality in fact awaits the advent of more advanced hardware and programming before we will actually see it on-screen. But even at the present level, most people like the arcade games' gaudiness and quick action. Only a relatively small handful of publishers put out text-based recreational software.

Makers of text-based recreational software insist that in ten or fifteen minutes users will get hooked into experiences far more fascinating than graphics adventure games can supply in the long run. The promise that such software offers, say these manufacturers, is to give the player an opportunity to become an active participant in a story, not simply a player in an indeterminate setting.

You can't just grab your machete and wade in, though. It may take an hour of poring over a game's accompanying manuals and maps before you can even start playing. If you try to run the program right off the bat, you'll either get bogged down trying to talk to the computer while it placidly declares "I don't understand you" after each attempted query or command—or you'll promptly get killed or stopped cold because you don't know the spell for repelling a Grue, or some other arcane bit of information. Some games will even follow this up by rubbing salt in your wounds with some sardonic comment on amateurs wasting the Dungeon Master's time. To their credit, sophisticated graphics programs are easy to learn and use. For example, you can learn to fly the

Text-based interactive stories depend greatly on your ability to conjure up "movies of the mind."

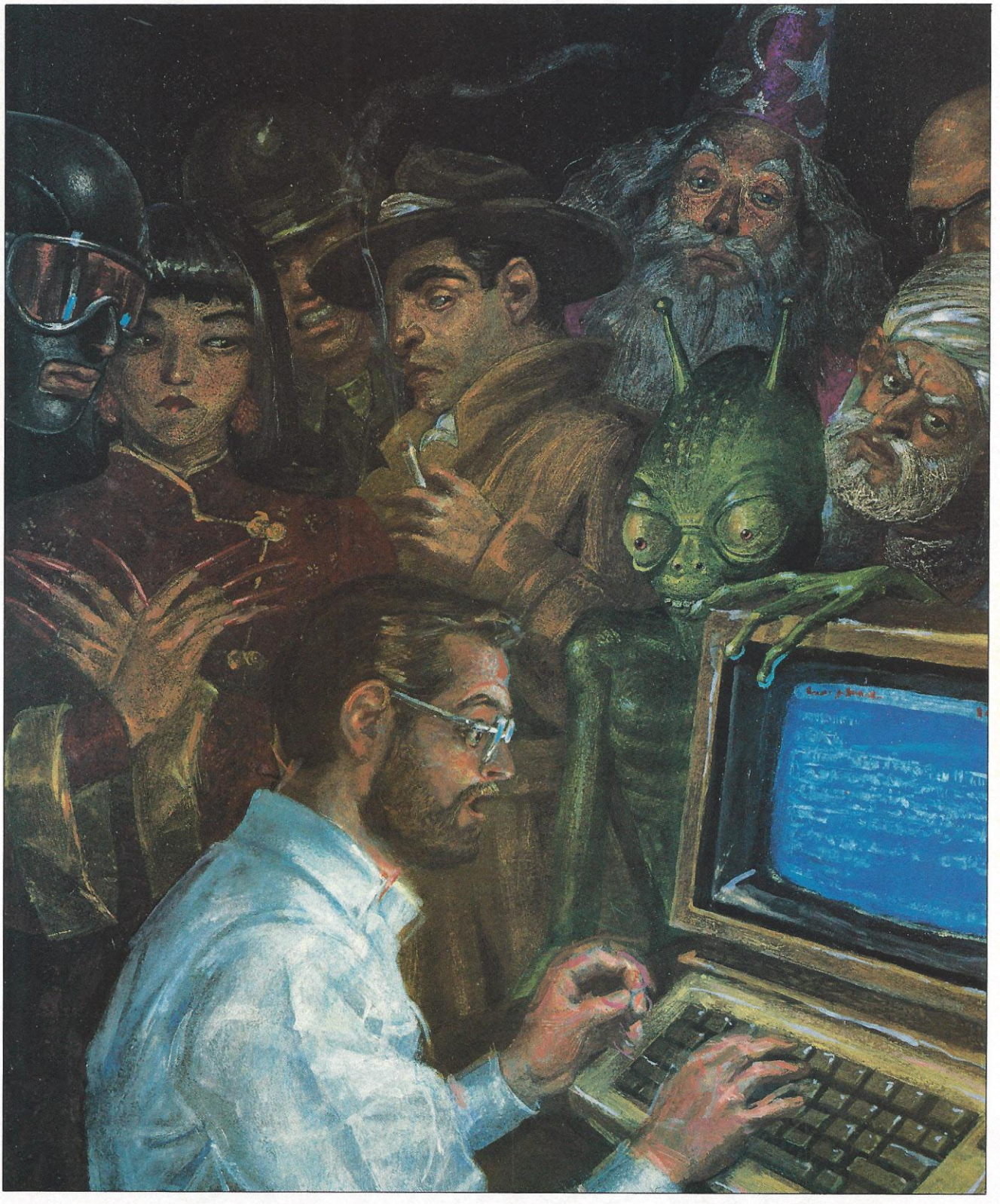

Illustration by Thomas Woodruff

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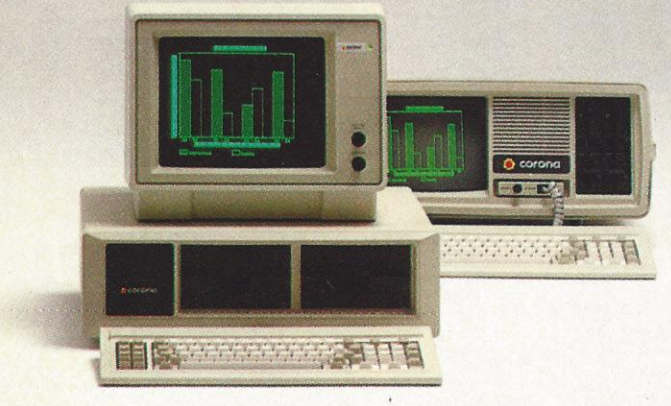

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helicopter in Choplifter from Broderbund Software (one of the all-time best arcade-style games)in under one minute—and be blasting away at enemy tanks the next.

So text-based games remain a somewhat arcane part of personal computing. Burt Sloane, a systems programmer for Apple and gameplayer for many years, says it takes some thirty to forty hours to fully explore the typical text-based adventure program. Games which simulate business or historical situations usually take less time, sometimes as little as an hour. Much of this time investment will be spent in preparation and, perhaps, in wonderment, simply trying to grasp what is going on. But game players like Burt swear that the best of the text games offer rewards equal to a good book or a good movie—though in a radically different way.

Text-based recreational programs share a common metier: "interactivity." At their core, such programs present you with situations and then react to your choices. You're standing by a lake, for instance. Do you go back or go in? You must go in to succeed, but if you fail to put down your lantern, it becomes inoperable for the rest of the game. Even when these actions occur in a fantasy context, you can expect there to be an inner logic to what happens. Be warned, however, that some games violate their own logic at times. The good ones generally behave themselves in this regard, though they will possess what might be called a "Hand of Fate" component. This ensures that if you repeat the same sequence of moves the second time you play a game, different things will probably happen, just as in real life. And the better games will apportion such events according to the laws of probability. If you choose, say, to go to Kansas, you run a greater risk of running into a tornado than if you go to Oregon. If you go into the lake, one time out of twelve a giant fish may have you for brunch.

Interactivity involves time, of course. Most games allow you as much time as you want between moves, but often limit how many moves you may make before you must achieve your goals or avoid failure. Some have real-time events as well, so that the game presents you with both strategic and tactical challenges. You may plan the campaign at leisure, but get no pause in the middle of a dogfight.

Games for solo players may actually be played with a friend—or even a team of friends. You may also find yourself playing more than one role. In the Infocom game Suspended, you play a character who must direct half a dozen semi-sentient robots simultaneously, so you play seven parts. In Wizardry, Sir-Tech's semi-text role-playing fantasy, you assemble a group

HOW TO GET THE MOST OUT OF INTERACTIVE FICTION

Burt Sloane—hacker, systems-level programmer and computer game enthusiast—offers some advice to novice text adventure players. With this new mixture of game, story and puzzle, "you have to be patient," he says. "Remember what Chairman Mao said: 'One step backward, two steps forward.'"

According to Sloane, this adage has several implications. For one thing, however much you may want to slit the plastic wrapper and pop that new disk in and play right away . . . don't. Reading through the instructions first will almost invariably get a player farther down the road quicker. The impetuous "die" quickly, having learned but little. In a new situation, it often pays to forego action in favor of examination. Even so, the beginning player will invest many "lives" learning what works in the maze-like worlds of the adventure games. The player needs a sort of creative adventurousness, a willingness to try something off the wall to break through a seemingly impossible conundrum. However, if the player has done the required homework, the "deaths" will pay off in future successes.

Good game players not only hold back and start slowly, they also make detailed maps of every part of the game landscape, and take note of significant objects, beings and events that are encountered. Sometimes a piece of bread will be more significant than a chest of jewels. For example, you may need a creature's help when only feeding the beast will serve the alliance. Those who try to rely on memory alone for such minutia may progress quickly for the first half hour. But once they get thoroughly immersed in the game, the details will swamp players who lack eidetic memories.

It takes a mixture of boldness, caution and homework to prosper in text adventure games. The first preparatory step is to read up on the game's language. Find out as much as possible about the vocabulary and sentence structures a particular game can handle. Manuals almost always include a list of words (especially verbs) and typical sentences the game can understand. Therein might lie invaluable information. Sloan recommends "Take All" as one of the best commands in Infocom games. "Even when you can't take everything," he says, "what the game says you can't take may be the clue you need."

However, Sloan adds that most games won't let you lug half the objects in its world around with you. But you can find central areas in most text adventure worlds where you can leave possessions when necessary. Another example of Mao's maxim at work comes in here: You may need to place a strategic item—say, a torch—in a place where you'll need it later, and then you won't be able to carry it with you at that time

Burt saves his most important advice for last: "You don't have to play alone, you know. Get someone to sit down with you—go through it together. It gives you a different point of view." Besides, you may find it a great way to get to know someone better.

of adventurers and play all their roles.

Next to their interactive nature, text-based computer games show a distinctive "face" to the player. This ranges from the prose-in, prose-out classic text adventure format (exemplified by Infocom's games) to the graphs, charts and columns of figures in business games like Bank President from Lewis Lee Corporation in Palo Alto, California. In the middle of these extremes you will find something like Executive Suite, sold by Software Publishing, which speaks to you in prose and gives you multiple-choice menus through which to communicate, as opposed to the "natural language" interface that Infocom games use.

Most of the games require that you take up pen and paper as well—not to communicate directly with the game, but to record notes to yourself. Game players in search of excellence—or just survival—make maps or jot down calculations, for example. Many games take place in maze-like landscapes which few players could negotiate without marking their trail. And the games will often contain imbedded puzzle sections which further challenge your skills at spatial imaging. You may wind up feeling that you've shrunk and crawled into a Chinese block puzzle, trying to solve it from within. The business games may tangle you in as many charts and figures as a stiff spreadsheet session. A collateral industry has sprung up around the most popular games, enabling you to buy ready-made maps or tip sheets. For some programs, you can even buy "cheater" software. For instance, you can find ads for a Wizardry "template" program that gives the characters you create levels of strength and ability it would take you many hours of play to build up by yourself. Infocom sells maps and tip sheets for their text adventures that will "save" you hours of play. But for what reason? You would not feel you won a boxing match if you plugged your opponent with a .44, would you? A better idea for getting help is to team up with a friend to play.

Besides your own notes, most games provide you with a stack of colorful material to wade through, which can weigh heavily on how much you enjoy the game. The materials have three functions: copy protection, useful data and atmosphere generation. Few classes of software have been subjected to as much computer piracy as games. A raft of ancillary materials (carefully laid out and color-coordinated to make photocopying as difficult as possible)—materials without which you can't get into or through the game—makes disk-cracking pointless. For instance, Infocom's Enchanter includes a bestiary of the game's monsters, riveted into a two-windowed shrouded wheel that lets you see and identify one at a time.

The less vocabulary a game understands, the more important a clear manual becomes.

Such materials do contain much you need for play, especially with games that try to have you communicate in English rather than select options. You really need a list of typical sentences that do and don't work on the game's parser (written input interpreter), recognized verbs and nouns—things like that. Infocom games recognize over 600 words and full sentences (albeit simple ones), making it easier to talk to them. No one else claims anywhere nearly as large a recognizing vocabulary. Most other text adventures can only handle one- and two-word inputs from you. The less the game understands, the more important clear manuals become. We saw an advance copy of Hayden Software's Quest for the Holy Grail without documentation—just as a software pirate would experience the game. It looked good—multiple windows, a lot of characterization, real-time action sequences. But there was no way to figure out what the parser did and did not understand (beyond Go North, Go South, etc.). So there was no profitable way to interact with the game. The same holds for most good interactive fiction programs: They get the most mileage from a personal computer's limited memory and disk space by putting the facts in writing where they belong, reserving the program itself for interaction.

Manuals usually try to set up the style and linguistic tone of the game's milieu, to help you suspend your awareness that the garbage has to be taken out tomorrow morning, or that your daughter's dentist appointment is on Saturday—to banish all the here-and-now long enough to let you immerse yourself in the game's inner universe, just as you might become immersed in a book or movie. Infocom's Witness has its manual laid out like an old pulp detective magazine, with marvelous period illustrations and ads. But the text tells you how to run the game on your computer and how to talk to the parser. Maybe the detective "magazine" should have stuck to atmosphere generation, with an accompanying plain nuts-and-bolts pamphlet on handling the interface. Ditto the Enchanter manual, a pseudomagazine called Popular Enchanting, done very cleverly—but with a busy-looking imitation ancient parchment layout that hampers reading the information needed for playing the game. The manual for SSI's historical railroad industry simulation, Rails West, makes no bones about being a computer game manual. It lacks Infocom's flash and wittiness—but the content helps you immensely with the game setting and action. Manuals don't have to be at-

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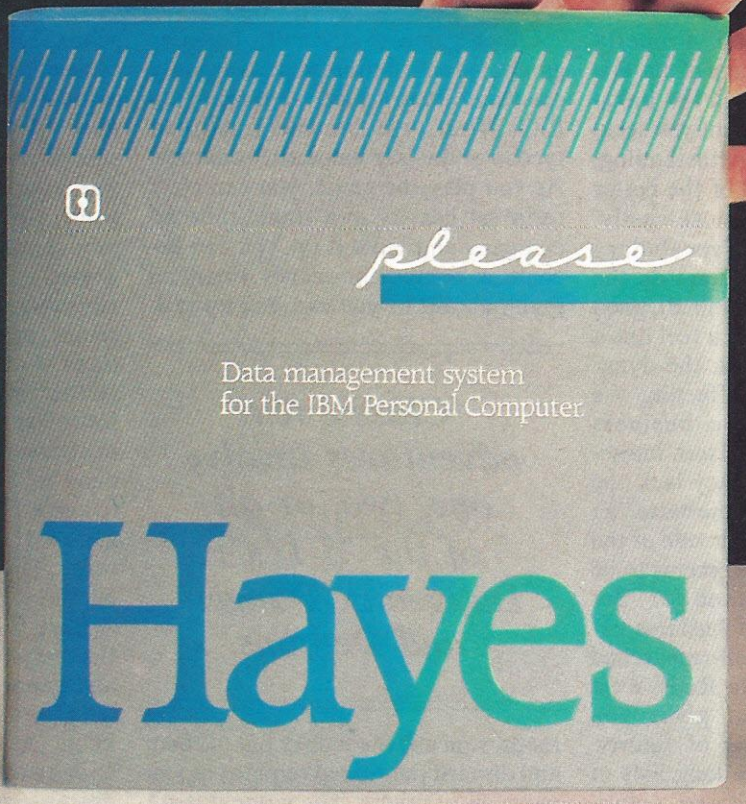

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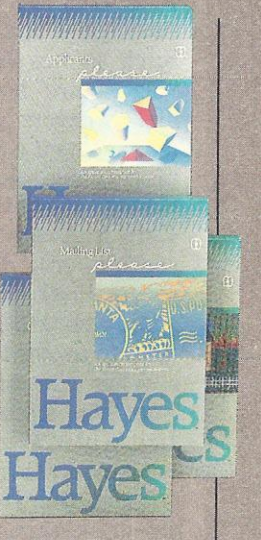

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mospheric to work well. Properly done, though, your package of materials can help give you both the information and the involvement you seek.

Notes and charts notwithstanding, you can enter the world of the better prose-oriented games most easily. However, their parser/vocabulary may put you off if you don't do the required reading first. All in all, good prose adventures make you feel like a character in a story, with the dynamism of your actions affecting the outcome. The hardcore business games place you farther from immediate personal actions; they lack the immediacy of "You hear the battering ram pounding on the other side of the bolted door. Your demise seems to be seconds away. What will you do?" But if you have any kind of business experience, you'll find well-researched real-life simulations like Rails West involving. Rails West gives you menus, charts and rows of figures. You make choices from long lists of alternatives, often specifying quantitative variables like how many (and what kind of) stocks and/or bonds you should buy for a given railroad. Such games let you work at the "big picture" level; and all those middle managers who aspire to senior management could have quite a time playing the role of corporate mogul. Canoga Park, California-based Blue Chip Software's Baron (real estate speculation), Tycoon (commodities speculation) and Millionaire (stock speculation) capitalize on a player's urge to aspire to positions of power.

When you play text-based games, you will discover a lot of variation in plot. With some, you get alternatives on a move-by-move level. Making the wrong moves sends you up cul-de-sacs, until you finally find the one path through the maze that lets you win. If the maze has enough complexity and richness of detail, the game should be a recreational bargain. Compare a $40 program that takes 40 hours to master to the cost of movies at your local theatre.

Other games—especially business games—don't define success in only one way. For instance, when you play Rails West, you become a railroad tycoon of the late nineteenth century. As you play the game, you can elect to invest heavily in a single railroad company and build it up; you can become a behind-the-scenes financial manipulator; or you can buy up railroads, squeeze the money out of them and discard the ruined remains as you move on to others. The game doesn't force you to choose any one of these paths. This open-ended trait truly exploits the flexibility that computers bring to interactive fiction.

Classic text adventures involve one, two, or all of the "3 D's": Dungeons, Danger and Demons.

You can experience most of these forms of interaction with both graphic and text games. The overall quality of the text-based games seems richer, though anyone is likely to prefer the best graphics games to the worst text games. Spinnaker Software recently previewed some promising graphics-based adventures involving well-known authors Michael Crichton and Ray Bradbury. Some authors appear to have simply lent their names and stories to adaption by computing professionals. However Crichton provided a flow-chart for his entry himself, which helps give it some of the markings of other Crichton thrillers. Don't look for philosophical depth in this series, but if you buy one of the programs for your children, you may find yourself playing them too.

Classic text adventures involve one, two, or all of the "3 D's": Dungeons, Danger and Demons. These evolved from old myths and fairy tales through modern works like Tolkien's *Lord of the Rings*. Infocom got its start in this genre with Zork I, which was adapted from a minicomputer game. (The company still sells DEC minicomputer versions of all their games.) In most of the classic text adventures, the player explores the rooms, passageways and natural features of a somewhat claustrophobic subterranean landscape, searching for treasures while trying to avoid being consumed, skewered or otherwise done in by the resident nasties. Infocom's Fantasy Series now includes Zork I, II and III, Enchanter and Sorcerer. The last two focus much more on magic than the first three.

Burt Sloane likes Zork III more than any other text adventure game in any genre. He says it provides challenge without tying your brain in knots, and has subtler interactions with creatures and characters in the drama—you don't just knock off every being you encounter.

On the other hand, Darnell Gadbury, a long-term product evaluator for Softsel, one of the largest software distributors, recommends starting with Zork I. In terms of difficulty, Darnell ranks the Infocom fantasy adventure games in the following order, from easiest to hardest: Zork I, II, III. Then there is a big jump to Enchanter and Sorcerer. He adds that the Zorks are easier to play than Infocom's Science Fiction and Mystery Series games. Playing through one of the puzzles imbedded in all these games may take 4 or 5 hours, much of which will be spent merely figuring out what you can and should do—much less doing it.

Role-playing fantasies share the same roots as fantasy text adventure games, with games like Dungeons & Dragons being the direct antecedents. Role-playing fantasies occupy an intermediary state between pure text and pure graphics games. In playing them, you typically assemble a group

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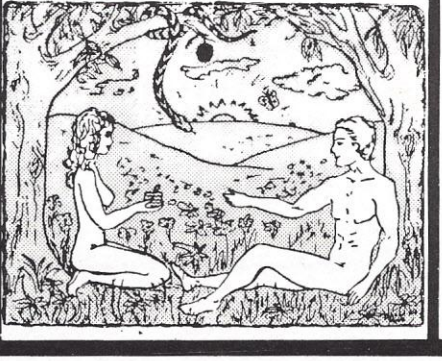

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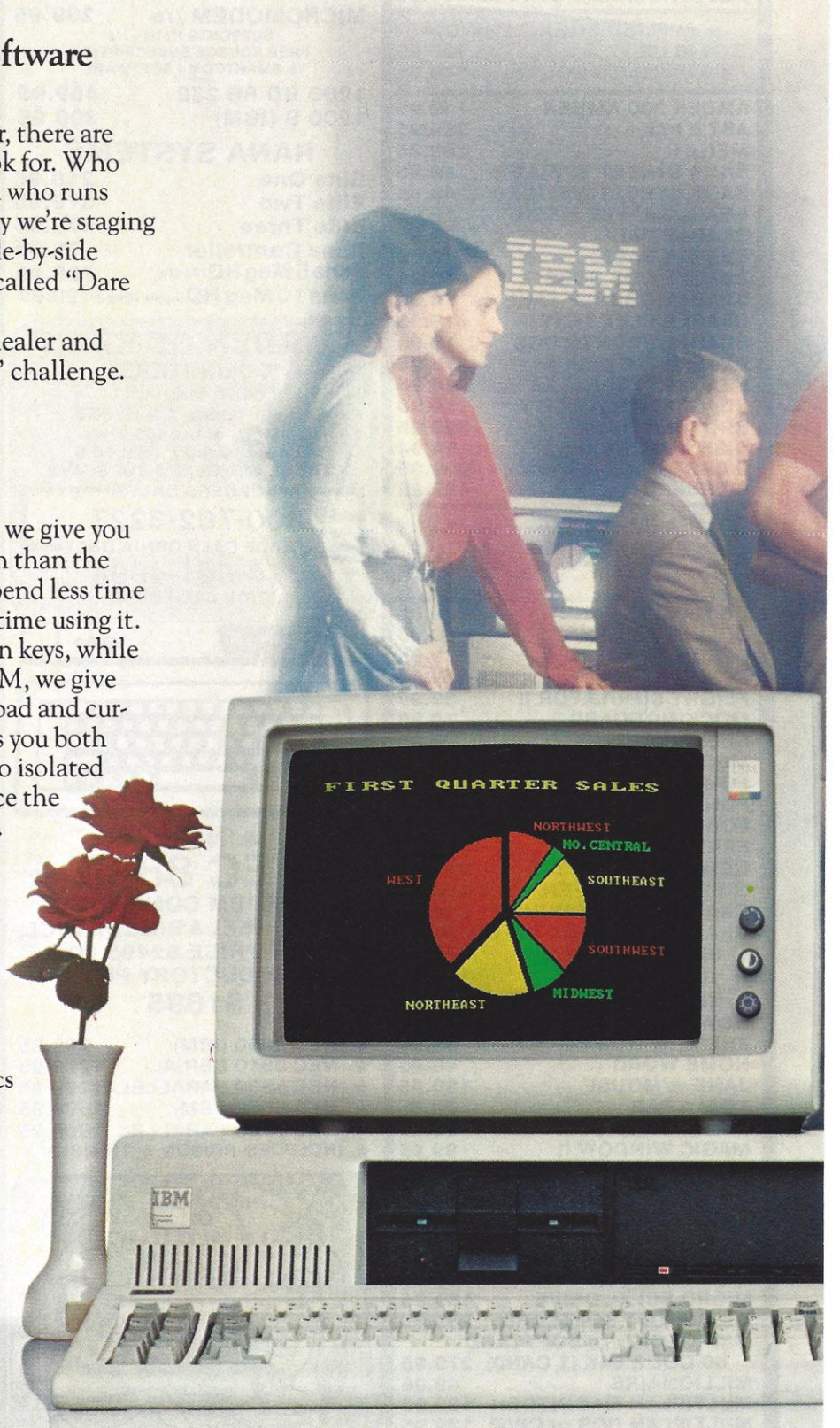

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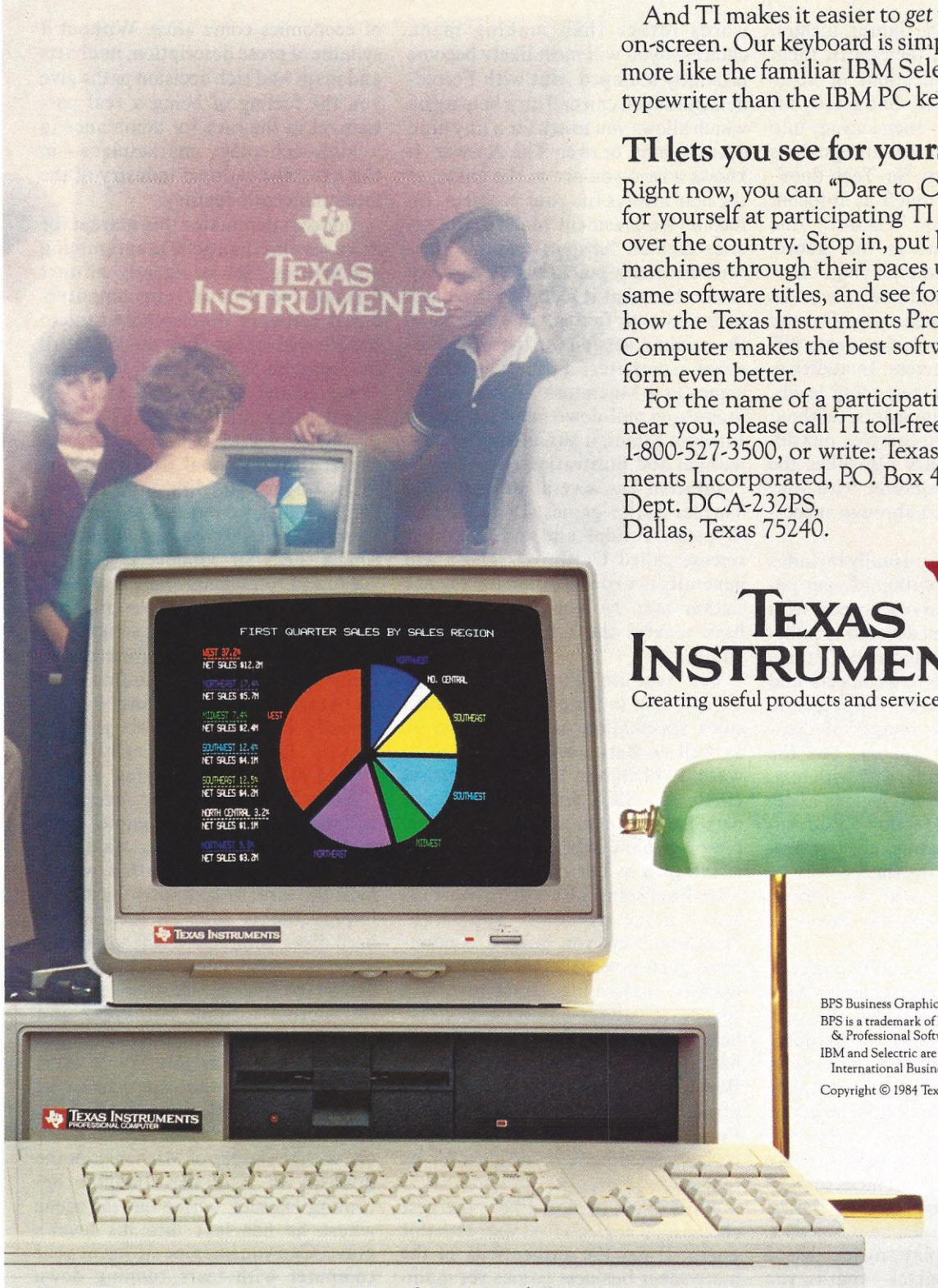

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Will graphic adventures eventually replace all the text games? Nonsense. Movies didn't replace books, did they?

of characters—say a fighter, a thief, a mage or a priest; then outfit them with quantified collections of attributes and gear—all budgeted out within strict limits—then journey into the maze with about the same goals as the text adventurers. Sir-Tech dominates this field as much as Infocom dominates the first. Wizardry, the most popular game in this genre, could be called a role-playing, character-building game. It is a game to be played over and over, says Darnell Gadbury, because you can create different sets of characters. In addition, you can stay in the beginning levels, hacking away at monsters, without diving into the more complex puzzles and riddles. Gadbury also likes the fact that you can continue with your developed characters through successive scenarios.

The screen display usually includes a dynamic representation of your position in the maze in one corner, with the rest of the screen devoted to information about your characters' status and condition, and to prospects and instructions to and from the program. Occasional graphic images of creatures encountered appear, but the screen display sticks largely with text. Wizardry has attracted legions of devotees, and spawned follow-up adventures to the basic game, cheater programs, maps and tip sheets. But be prepared for creating the story line in your own mind from the on-screen information readouts.

Infocom's Science Fiction Series includes the extremely complex Suspended and Starcross, and the still-pretty-tough Planetfall (a sardonic comedy). If you feel comfortable with science fiction and are a complete novice at interactive fiction, however, you might consider first trying Forbidden Quest from Pryority Software of Carmel, California. It lacks some of Infocom's refinements and subtleties, but it has an on-screen help function. The first time you play any text-based games that use a parser—that is, you communicate by keying in written words rather than making menu choices—you will most likely become promptly stumped. But with Forbidden Quest you can call up a help menu which allows you to ask for a tiny hint, a broad hint, or even The Answer. It knows where you are in the game, so the help always fits your problem. Infocom vice-president Marc Blank decries such an "unsportsmanlike" feature. He has a point, but he may not remember what it feels like to be new to interactive fiction. In addition to the original version for the IBM Personal Computer, Forbidden Quest comes in a Macintosh version with a mouse and pull-down menus. Like the Infocom games, it has an atmospheric manual and illustrations.

Infocom has several Mystery and Thriller Series games: Deadline and Witness, Infidel and a September release called Cutthroat. These will generally tax you less than the science fiction ones. No one else appears to have tackled these genres with text games.

For "real life" and business games we can look to Blue Chip Software's stock speculation game Millionaire, as well as Baron and Tycoon. Software Publishing's Free Enterprise, created by SRA Software, is a complex management simulation game. Heroism in the Modern Age by Pacific Infotech in Los Angeles and Software Publishing's Executive Suite offer a more personal approach. "Heroism" lets you build a contemporary character you take through the maze of modern life. "Executive" is a corporate ladder-climbing exercise based on savvy office politics. Nomination from the Brady Company of Bowie, Md., lets you rerun this year's primary race. And Lewis Lee's Bank President program has garnered rave reviews from banking officers for its realism.

Rails West is most likely the best choice for a novice's first spin with this group. It has the authenticity of the more sober business games yet maintains the potential to make the science of economics come alive. Without a syllable of prose description, its charts and maps and rich decision paths give you the feeling of being a real participant in the race for dominance in a high-technology marketplace—in this case, the railroad industry of the late nineteenth century.

Infocom dominates this market for more reasons than good programming and writing. Its stringently all-text format and unique minicomputer-based software development system has allowed it to publish versions of all its games for the following: the Apple II series and Macintosh; Atari (all models); Commodore 64; 8″ CP/M disk; DEC RT-11, Rainbow and DecMate; IBM Personal Computer and PCjr; Kaypro II; Mindset; 5 ¼″ MS-DOS 2.0 disk for most IBM compatibles; NEC PC-8000 and APC; Radio Shack TRS-80 Models I, III and 2000; TI Professional and 99/4A; and Wang PC. Most other firms' products are made for the Apple II series and/or the IBM Personal Computer and compatibles. You will also find them on Atari and Commodore 64, especially if they appeal to younger players. List prices generally range from $30 to $60, averaging at $40.

Some have said graphic adventures will replace all these text games eventually. Nonsense. Movies didn't replace books, did they? Rather, we can look forward to computer hardware improvements such as inexpensive hard disks, interactive videodisks and more powerful microprocessors that will enable even richer, more detailed interactive fiction, both text and graphic. Currently, even the longest games function as interactive short stories. Imagine the experience that would be available from a novel- or play-length text adventure game—one with the sweep of Michener, or the intensity of Faulkner. Imagine becoming Hamlet, acting out the scene where he has lept into his lover's grave. Can you imagine sitting at your computer with tears running down your cheeks?

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Current Offerings From The Computer Book Press

■ Electronic Illusions
■ Whole Truth Home Computer Handbook

Technology: Conqueror Or Liberator?

ELECTRONIC ILLUSIONS: A SKEPTICS VIEW OF OUR HIGH TECH FUTURE
IAN REINECKE
PENGUIN BOOKS
NEW YORK, NY
256 pp., $7.95

The invention of the microchip and the subsequent development of computers have doubtlessly been among the most important occurrences in this century. Not since the Industrial Revolution has there been the possibility of entirely reshaping the ways of life and business of the entire world.

Proponents of high technology have proclaimed a near-utopian society of the future. All we have to do, it is often proffered, is use this technology at every opportunity. In *Electronic Illusions: A Skeptics View of Our High Tech Future,* author Ian Reinecke attacks the broadstroke proclamations of the "techno-boosters." Among the platitudes that he questions are the claims that as society becomes more computerized and efficient, working conditions will become ideal, the work week will be shorter, "dirty work will be eliminated from factories . . . every home will have a terminal . . . elections will be conducted by two-way television . . . consumers will shop electronically" and, all in all, "life will be conducted on a higher plane in the high-technology society."

How could anyone criticize the promise that our lives are destined to be so much better?

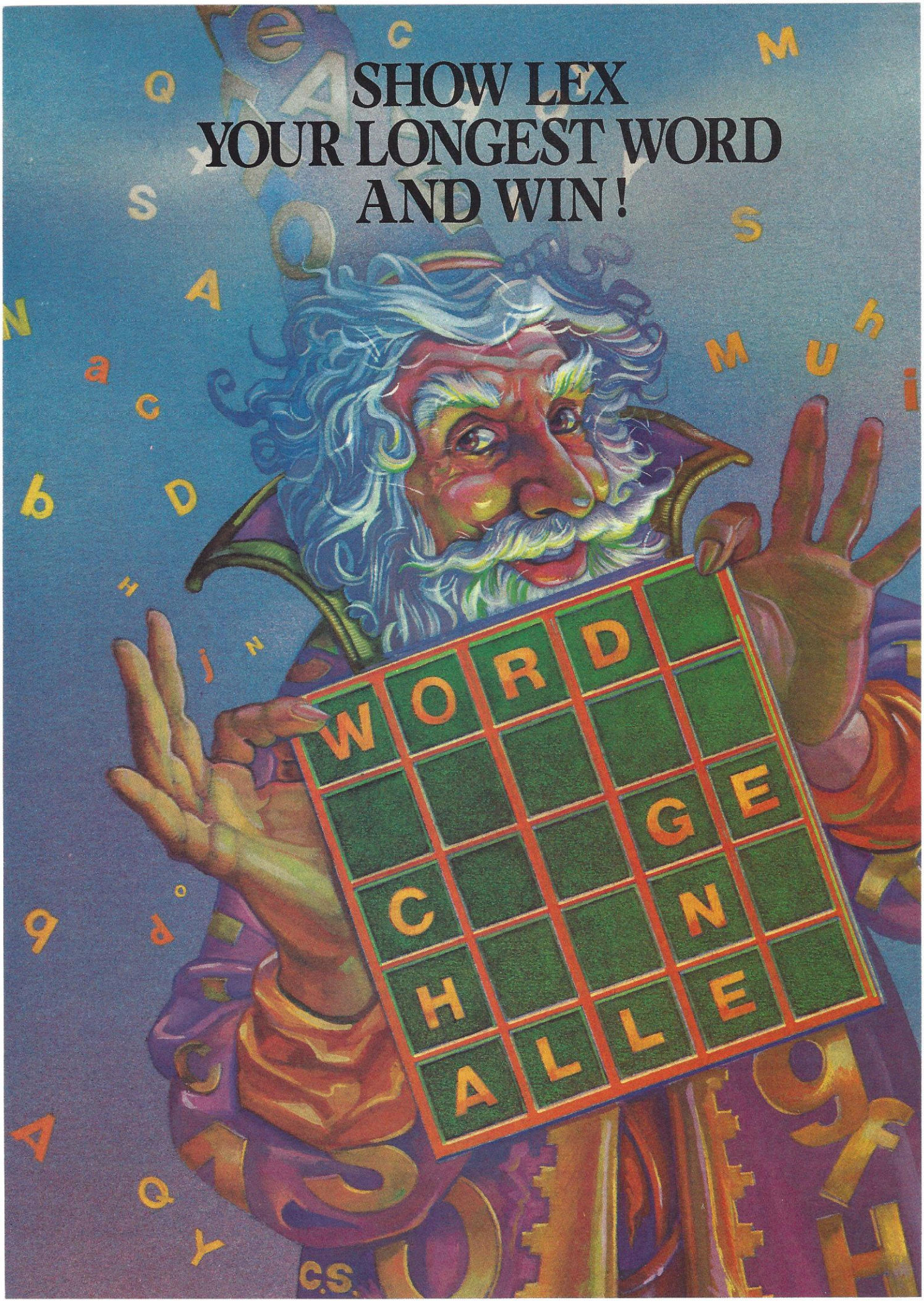
It is easy for Reinecke, an Australian computer journalist and self-described "techno-skeptic." "If technology is so good for us," Reinecke asks, "why haven't we all benefited from it? If computers are more efficient in running businesses, why aren't employees paid more? Why are so many computer systems used to tighten control and increase surveillance rather than expand personal freedom? As computer technology eliminates employment, where are the new jobs coming from?"

Electronic Illusions is Reinecke's attempt to combat some of the misinformation that is being spread by a headlong drive to extend high technology to every aspect of life. The author seeks to temper utopian visions with some often contradictory realities.

It is true that the computer industry has created new jobs, Reinecke says, but most of these are either for extremely low-paid manual workers in countries such as El Salvador and Indonesia (where workers are often limited to a useful work-life of four years before their eyes become so bad from working on microchips that they can no longer use the microscopes needed in their work). Or, jobs have been created for a relative few highly paid, highly skilled professionals. It is estimated that high technology will only produce five percent of all new jobs by the end of the century, but will eliminate many more. "Technology will eliminate some jobs almost without trace by 1990. Traditional craft industries such as printing and telecommunications will disappear. Other occupations that we now regard as highly skilled, such as diagnosing faults in machinery or moderately skilled, such as clerical work and typing, will become significantly less skilled."

This degrading of job skill worries Reinecke. Too often, those who integrate technology and automation into offices and factories consider human workers just another fallible part of the work production system. "The value of the human being is as part of a whole, a component of the system. The designers of the technology have treated the worker as an equal with other components. It is an egalitarian approach; it treats mechanical and human parts in the same way."

Using the office environment as an example, Reinecke notes that the introduction of word processing and personal computers has been aimed at eliminating duplication of work. The manager can take over some of the secretarial functions on his personal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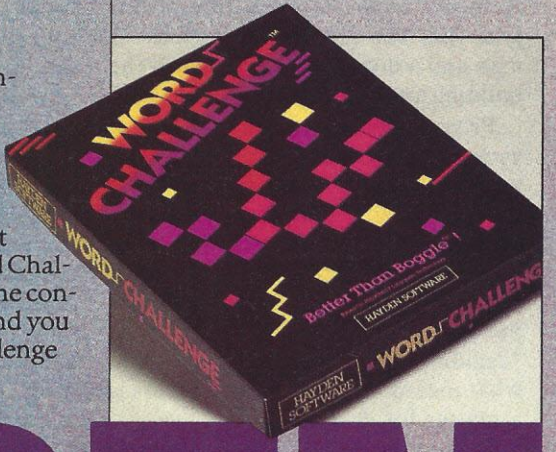

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computer and the typing pool can handle the rest. This creates greater efficiency and makes the manager more responsive to the management hierarchy since he or she no longer has the buffer of a secretary.

But it eliminates secretarial and clerical jobs—70 to 90 percent of which are held by women—and makes what tasks remain simply mechanical keyboarding jobs that hold little or no opportunity for advancement. Many lower level managers also resist high technology changes, feeling that typing their own letters instead of dictating them demeans their position.

Similar things happen in other areas where high technology is extensively employed—most notably in manufacturing and the telecommunications industry. Jobs that once required specialized skills now just involve watching a computer. About a new telephone exchange in England, Reinecke says telephone technicians joke that the facility only needs "a man and a dog—the dog to guard the building and the man to feed the dog."

From the business owner's point of view, computers are labor-saving devices that make remaining workers more efficient. However, Reinecke says, being just an efficient cog in an industrial machine is a far cry from the image that the techno-boosters purvey. To enrich everyone's lives, "deciding where technology goes and what means are used in the process is a matter for everyone."

In the meantime, what is there to do? At a question and answer session following a talk on new technology, Reinecke recalls, "instead of a question there came a despairing cry: 'Well, what's there left to ask? We might as well all go out and cut our throats.'" Somehow that doesn't seem to be the answer either.

Reinecke says he wrote this book for "that small body of people who place human beings above machines and don't apologize for it." To such readers, *Electronic Illusions* will simply be a confirmation of ideals. To others, it promises to be an introduction to some hard questions and not-so-pleasant realities.

—Orlan Cannon

Of Secret Societies And Modern Romance

THE WHOLE TRUTH HOME COMPUTER HANDBOOK
CHARLES PLATT
AVON BOOKS
NEW YORK, NY
208 pp., $5.95

What *is* the truth—the whole truth—about the home computer? According to Charles Platt, the truth is that very few people actually need one or are able to do anything useful with one once they buy it. So why were four million of them sold between 1976 and 1983? In answer to this question, Platt states his First Law of Computers: "Whether a computer can do anything useful has always been beside the point. Simply fiddling with the thing is an obsession in itself." The nature of this obsession, from the first twinges of computer lust that come from seeing those glossy, full-color foldout ads, through its various, but always debilitating permutations, is the subject of Platt's book.

For Platt, a home computer serves no real purpose, except to give its purchaser entree into a secret society of the computer literate. These are the people who murmur secret words like bit, byte and ROM at cocktail parties while avoiding hostile glances from less than understanding wives. One advances through the ranks of this secret society by learning more secret buzzwords and, of course, by buying more expensive equipment.

Even if two people do the same kinds of things (read "mess around uselessly") with their home computers, the one who speaks of IBM and Assembly language rates higher in the society than the one who speaks of Commodore and BASIC.

These computer users are nearly always male, according to Platt, who asserts that women are more practical and sensible than men and less likely "to get off on the power fantasies of programming." Be that as it may, the male orientation of the book leads to the source of much of its humor—a constant supply of adolescent fantasy jokes.

Much of the book seems to be a light-hearted spoof of the legions of serious computer handbooks impossible to ignore at the local bookstore. For instance, in the middle of an alphabetical listing of personal computers by brand name, Platt throws in such beauties as the "Brute," a user-hostile machine with no backspace key—"any operator who enters an invalid statement is punished with a sharp jolt of 115-volt house current"—and the "Mastodon" with built-in psychoanalysis program, Go board, optional roving robot guard and holding pen for intruders.

Although computers may pretend to offer increased productivity and time savings, this too is a myth, says Platt. "It's more important to *look* efficient than to *be* efficient," is his Tenth Law of Computers. For example, fancy word processing equipment may be no more efficient than a good typewriter (in fact, it may be a lot less efficient—with a typewriter, it's almost impossible to turn out 20 pages of underlined text just because you forgot to cancel the underlining command), but it sure impresses out-of-town visitors.

According to the book's cover, Platt "teaches programming at a New York college, sells his own software and writes funny books." At times this is a very funny book, and through it all, Platt conveys this simple message: Computers in the home are fun, if less than useful most of the time.

—Orlan Cannon


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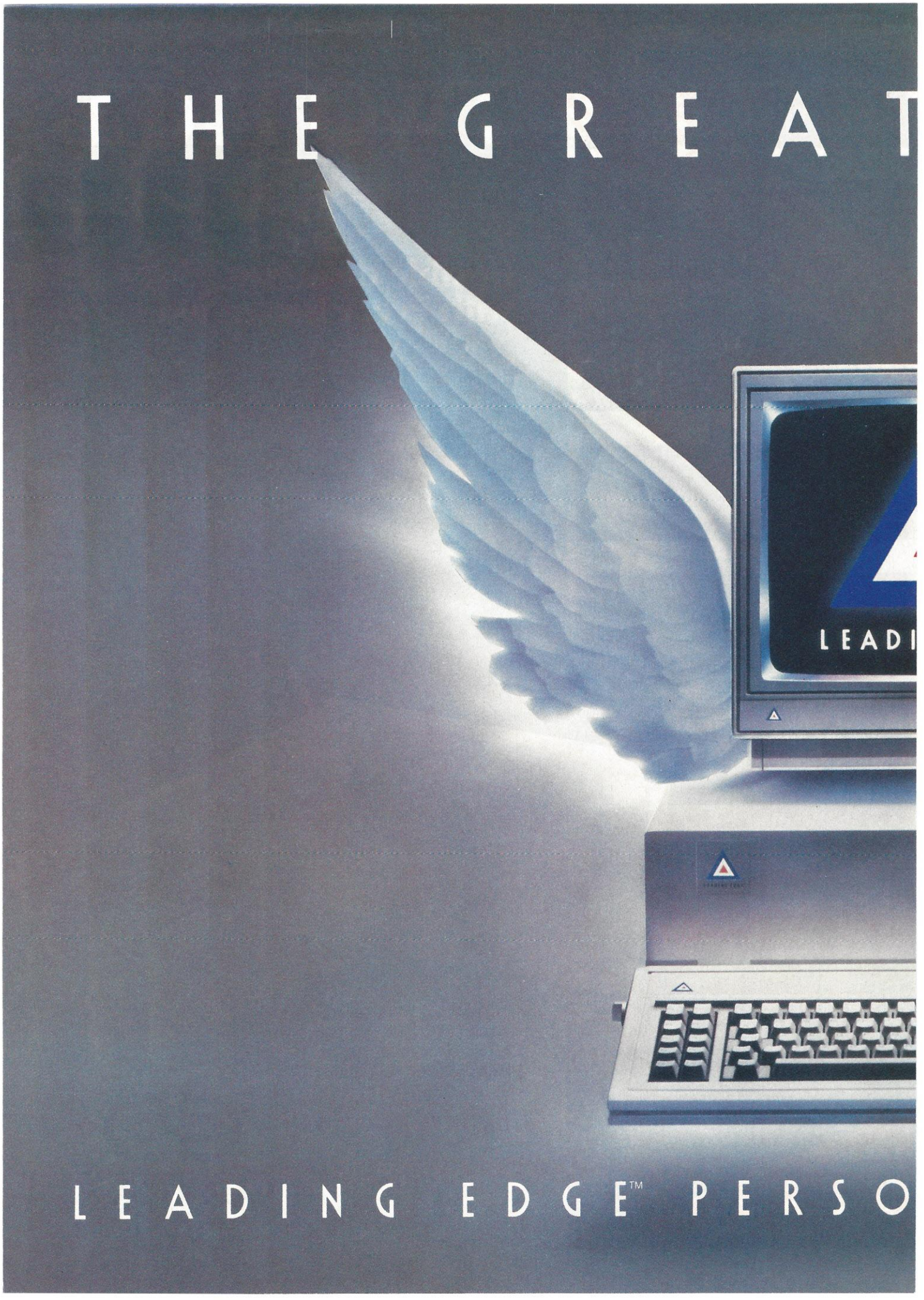
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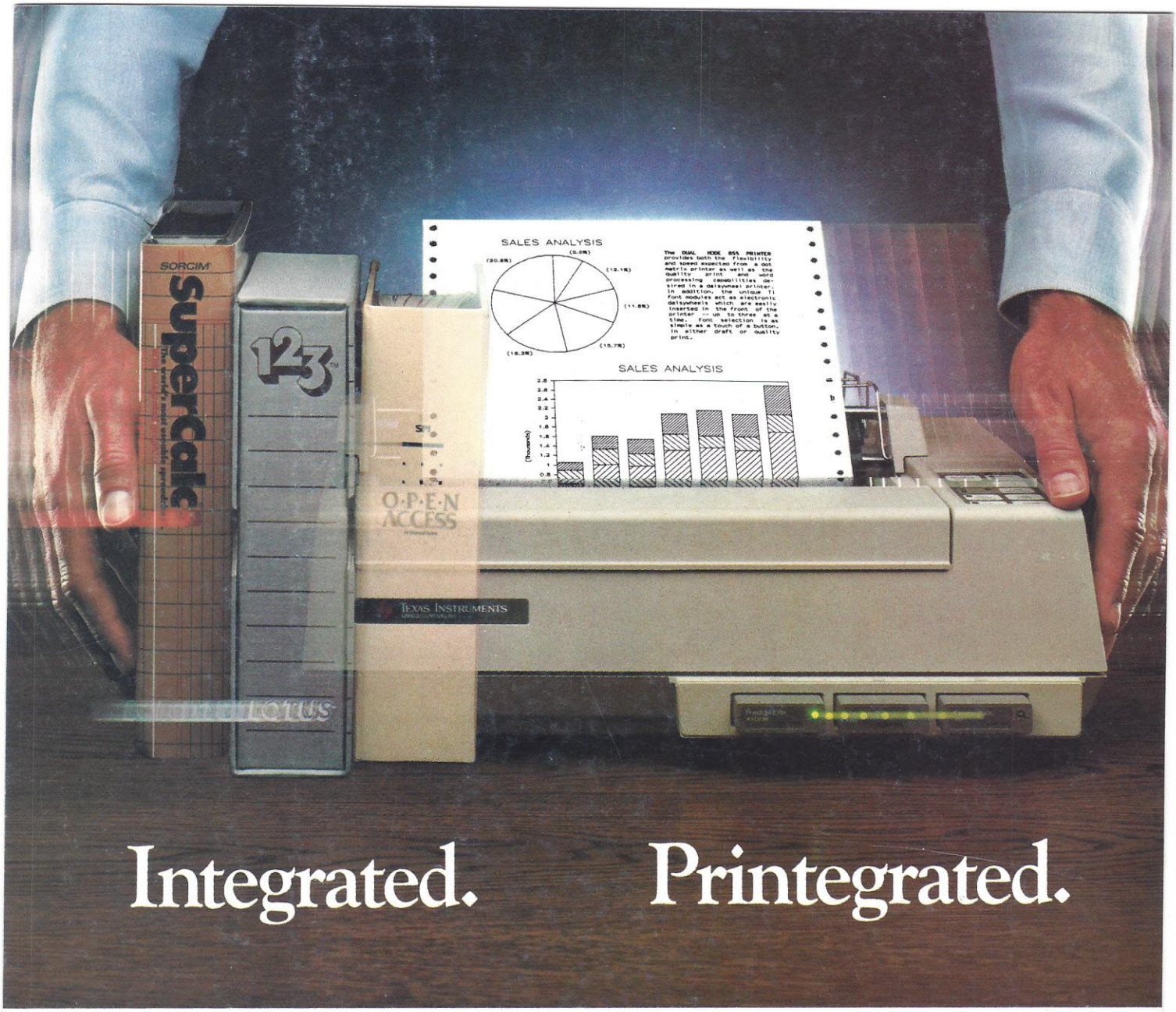

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